Modern Management in China, with a Case Study of Lean Production in State Auto Components Companies

Li Wu

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ABSTRACT

This thesis explores the introduction of modern management techniques into the Chinese public sector and in particular the effects of this on the labour process in the auto components sector. This research project, from the perspective of industrial sociology, not only seeks to examine how social relations mediate the implementation of new management techniques, but also focuses upon the impact of these techniques upon workers.

There has been an enormous amount of academic research on the diffusion of modern management techniques, particularly lean production, in North American and European settings. In contrast, there is a lack of research on the introduction of lean production into developing countries, particularly China. This research project tries to fill this lacuna by providing many first-hand stories of how managers implemented lean production and how workers viewed the changing nature of their work.

The thesis utilises both qualitative and quantitative research methods. A survey was conducted amongst 24 companies in 8 industries with 1,012 managers across Shanghai. Case studies were conducted in the several auto components companies, where 582 workers responded to questionnaires, and managers, workers and union officials were interviewed. Three fieldwork trips took place between August 1998 and November 2000.

It is seen that lean production has been implemented under pressure from joint venture component customers. The building of a harsh disciplinary regime and the elimination of labour through closing up the porosity of the working day have been integral parts of this process. It is evident that lean production has resulted in significant increases in work intensity and work-related stress. However, it is also found that workers have gradually accepted the new management techniques under the pressure of fierce market competition and their knowledge of massive lay offs elsewhere in the economy and by virtue of certain material advantages.

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the Regulation of the University of Bristol. The work is original except where indicated by special reference in the text and no part of the dissertation has been submitted for any other degree.

Any views expressed in the dissertation are those of the author and in no way represent those of the University of Bristol.

The dissertation has not been presented to any other university for examination either in the United Kingdom or overseas.

Li Wu ***16th Sept. 2002***

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ABBREVIATIONS

ABC	Activity Based Costing
ACFTU	All-China Federation of Trade Unions
CEMA	The China Enterprise Management Association
BPR	Business Process Re-engineering
DRS	The Director (Manager) Responsibility System
FDI	Foreign Direct Investment
FEEs	Foreign Funded Enterprises
FP	Flexible Production
GDP	Gross Domestic Product
GMMTs	Global Modern Management Techniques
GVW	German Volkswagen
HRM	Human Resource Management
IMVP	International Motor Vehicle Programme
ISO	International Standard Organisation
JIT	Just-in-Time
JVs	Joint Venture Enterprises
LP	Lean Production
MACI	Michigan Automotive Compressor, Inc.
MBA	Master Degree of Business Administration
MRP	Material Requirement Planning
MRPΠ	Manufacturing Resource Planning
QCs	Quality Circles
R&D	Research and Development
RMB	Ren Min Bi (The Unit of Chinese Currency)
SAIC	Shanghai Automotive Industry Corporation (Group)
SDPC	State Development Planning Commission
SGM	Shanghai General Motor
SOEs	State-Owned Enterprises
SVW	Shanghai Volkswagen
TPM	Total Productive Maintenance
TQM	Total Quality Management

WERS	Workplace Employee Relations Survey
WIP	Work-in-Progress
WTO	World Trade Organisation
6S	Japanese: Seiri, Seiton, Seiso, Seiketsu, Syukan and Shitsuke, meaning cleanout, organisation, clean and check, standardise, discipline and custom.

Introduction

Chapter One: Globalisation of Management and the Economy

Studies of the diffusion of global, modern management techniques have focused upon firms in North American and European settings within advanced capitalist society. These studies have addressed crucial questions about contemporary changes in work organisation and employment relations across the globe. The most influential of these was *The Machine That Changed the World* (1990), in which Womack, Jones and Roos claimed that lean production would become the standard global production system in the twenty first century. There is, however, little research on the significance of lean production which makes reference to developing societies, particularly China.

China has undergone rapid changes as a result of reforms in the direction of a market economy and exposure to the world economy. The flow of foreign direct investment (FDI) provides an opportunity for Chinese managers to access global modern management techniques which have been implemented in both developed and developing societies. One piece of research conducted by Taylor (1999) examines the extent to which Japanese management practices are applied in twenty Japanese manufacturing plants in China. This piece of research, however, puts the emphasis on production technology and management rather than the sociological dimension.

This thesis explores how lean production was introduced and how it impacted upon employees in the state sector in China from a sociological perspective. This

thesis provides a first hand investigation of how managers, workers and the trade unions in Shanghai evaluated the changes and development that resulted from the implementation of lean production. It shows that the economic and social context in China influenced the views of workers on lean production. It draws upon industrial sociology and labour process debates by discussing how the implementation of lean production was implicated in the exercise of management prerogatives and the intensification of labour.

The main objective of this chapter is to provide a brief economic, social and theoretical background to the research. It starts with an analysis of the impacts of increased FDI and economic reforms on management in Chinese state-owned enterprises (hereinafter referred to as SOEs); it then reviews the literature on global modern management techniques, with particular reference to the debates on lean production; finally, it outlines the structure of the thesis.

1.1 China's Economic Transition in a Global Context

China's recent economic performance has drawn attention from around the world. The growth rate of China's average annual Gross Domestic Product (GDP) was 9.8% from 1979 to 1997 and over 7% from 1998 to 2000 when the world economy grew slowly. Its overall economic strength was ranked seventh in the world in 1999. At the same time, unbalanced development took place in different regions and different industrial sectors. Particularly, many SOEs suffered from heavy losses. Shanghai, with a population of 13 million, is the most important economic centre in China. In 1999, its GDP was RMB 403.5 billion, a 10.2% increase over

1998, and 3.1 percentage points higher than the national increase range (the exchange rate of RMB to the Pound is currently about 13:1); its industrial value added reached RMB 175.9 billion, with 9.6% growth over 1998; its total profits went up to RMB 25.8 billion, which was 30% higher than in 1998 (*Shanghai Economy Year Book*, 2000: 16). Shanghai also experienced a radical industrial restructuring and asset reorganisation. It is a fact that China's economic growth, Shanghai's in particular, resulted from the economic reforms and the development of trade and investment relations with the rest of the world.

1.1.1 FDI in China

Since 1978 when China opened its doors to the world, it has actively attracted FDI to its economy whilst foreign capital searches for cheap labour, land and lower raw material costs within China. China is the largest recipient of FDI amongst developing countries and stands second only to USA as a global destination for FDI. About 300 out of the 500 top multi-national enterprises have become established in China, mostly in the form of joint-ventures. By the end of November 2001, China had utilised a total of US$390.52 billion in actual FDI. According to official statistics, a total of 387,260 companies with foreign investment had been set up. FDI in China reached a historical high of US$45.5 billion in 1998, and averaged at about US$40 billion in the past two years following the Asian financial crisis. Furthermore, the State Development Planning Commission (SDPC) estimated that FDI in China would total US$47 billion in 2001 (*Xinhua News Agency*, 4th, December, 2001). The rapid growth of FDI in China is likely to

continue and may even accelerate after China's entry into the World Trade Organisation (WTO) in December, 2001.

Table 1.1 Industry Sectors and the Forms of FDI in Shanghai.

	Indicators	No. of cases	No. of cases	Value (US$100 mil.)	Value (US$100 mil.)
		Year 1999	Cumulative total by 1999	Year 1999	Cumulative total by 1999
	Total	1,472	20,406	41.04	390.34
By types of investment	Foreign capital only	817	5,643	19.29	108.33
	Joint ventures	399	10,661	15.11	184.07
	Cooperative	255	4,114	4.84	81.05
By Industry	Primary	15	148	0.81	1.30
	Secondary	841	14,011	20.31	208.47
	Tertiary	616	6,591	20.55	184.28

Source: *Shanghai Economy Year Book*, 2000: 326.

Shanghai has become the most popular place for FDI since 1992 when the emphasis of Chinese economic development shifted from the four special economic zones. The growth of FDI was accelerating dramatically in recent years. Investors from 95 countries and regions had invested in Shanghai. Of the world's top 500 enterprises, 256 had invested in Shanghai and 25 had set up regional headquarters there by the end of September 2001. Table 1.1 shows the industry sector and the form of FDI in Shanghai. In 1999, 'foreign capital only' was a main type of investment in terms of number of cases and value. By 1999, Shanghai had received FDI $39 billion and the secondary industry accounted for half the total.

In discussing the impact of FDI on the transfer of managerial techniques, Child and Rodrigues (1996: 46) argued that FDI provided an extremely important potential vehicle for the transfer of managerial and organisational knowledge in developing economies, as well of course for the transfer of technology as ordinarily understood. Shanghai SOEs have seen their formerly unchallenged market position dramatically eroded by foreign competitors, with millions of people being made redundant. In order to survive in the market, management in SOEs is increasingly seeking to improve productivity by adopting global modern management techniques.

1.1.2 State-owned Enterprise Reform

China's economic reforms aim at responding to external global competition and shifting towards the market economy. China had a planned economy dominated by SOEs from 1949. The result of this economic model was a lack of competition and low productivity. The reform of SOEs has been a central issue of the economic reforms since the 1980s. One of the major thrusts of SOE reform was the enhancement of managerial authority, both from external bureaucratic superiors and from Party domination within the firm (Lee, 1999: 55). The introduction of the 'director (manager) responsibility system' in 1984 ensured that management in SOEs were responsible for both the profits as well as the losses of their enterprises. Greater managerial power and authority were devolved as the means to enhance enterprise profitability.

A new Labour Law was enacted in 1995. In theory, it provides voluntary bilateral choices: managers gain a new licence to dismiss workers whilst workers enjoy a new freedom to switch jobs. However, in practice, labour contracts have accentuated managerial power at the expense of workers' interests (Lee, 1999: 55). It could also be seen that the exercise of management prerogatives might make it possible to introduce modern management techniques in order to pursue the goals of profit and productivity. However, employees were even more vulnerable than before in the face of a new management control system. The declining significance of the trade union and the Party branch inside SOEs exposed the glaring discrepancy between the formal advances made in the legal protection of workers' right and, in reality, the increased powerlessness of workers (Lee, 1999: 57).

The change of ownership structure in SOEs by the injection of capital from private or foreign sources was another thrust of the reforms beginning in 1992. SOEs made a break-through in implementing the strategy of 'take a firm grip on the large, let go of the small' (*zhua da fang xiao*). This means that large groups would be formed in 'pillar industries' and 'basic industries', with the state holding 'controlling stakes' whilst allowing non-state equity participation in corporatised SOEs. It was held that only exceptional products and military enterprises should be operated solely by the state; whilst small SOEs could change their system of ownership through mergers and bankruptcies if they failed to survive. Despite the inevitability of cut-backs, the state economy still occupied a dominant position in total social assets. It controlled the arteries of, and played a leading role in, the national economy (Lau, 1999: 69). By 1996, state-owned assets accounted for

58.6% of total assets and 43.5% of industrial total outputs (cited in Zhang, 1999: 50).

In 1999, Shanghai SOEs implemented the strategy of 'take a firm grip on the large, let go of the small' (*zhua da fang xiao*) to readjust state-owned economic structures, and the total volume of state-owned assets further increased by merging and 'transforming debts into shares'. By the end of 1999, state-owned assets distributed in the high tech industries, the pillar industries (including the auto industry), and public infrastructure and trades reached RMB128.9 billion, an increase of 13.4% over the previous year. State-owned assets in large enterprises (which have more than several thousand employees) accounted for 67.8% of the operational state-owned assets of SOEs and had increased 7.3 percentage points since the end of 1998 (*Shanghai Economy Year Book*, 2000: 28-29). The management in SOEs plays a more and more important role in improving competitive capability, and they have been increasingly able to access modern management techniques in an age of management globalisation.

1.1.3 Management Globalisation

Over the past decade, there has been a continual stream of innovation in management. These innovations include the development of new practices such as those embodied in lean production and individual techniques such as total quality management (TQM). They have commonly been seen as coming from Japan, but in reality have originated in many countries including the USA, Russia and UK, as well as Japan (Lindberg, Voss and Blackmon, 1998: 3). The globalisation of

competition has contributed to the diffusion of these global modern management techniques (GMMTs) around the world.

Whilst modern management techniques have been mostly implemented in developed countries, there is a growing body of evidence that these techniques are being increasingly adopted in the developing world largely through the activities of multinationals (Humphrey, 1993; Posthuma, 1991; Kaplinsky, 1995). There are reports of the application of new management techniques in some developing countries. For example, in their research on white-goods manufacturing in Turkey, Nichols *et al.* (2002: 68; 81) have observed, 'the velocity at which new ideas have been imported into Turkey has increased considerably over the last few decades'; 'there is evidence of training, teams, and an interest in kaizen and suggestions from the shop floor in all of the plants'; and the 'hard' rather than 'soft' variants of TQM have been implemented there. It is also found that firms in Argentina have implemented techniques such as just-in-time (JIT), kanban, and TQM (Paladino *et al.*, 1998: 46). Brazil is another case in point. It is reported that the diffusion of modern lean management practices increased in the early 1990s (Fleury *et al.*, 1998: 63). As a specific example, the production system has changed in a VW truck plant (Abreu, Beynon and Ramalho, 2000). Despite the uses of individual techniques in developing countries, it is argued that human resources, inter-firm cooperation and management are specific obstacles in the systemic application of Japanese management techniques (Kaplinsky, 1995: 57).

Modern management techniques have been introduced into China for over two decades. In the beginning of the 80s, management in China was increasingly

encouraged to learn about modern management techniques in order to accelerate the modernisation process of its industry. The popularisation of TQM and 17 other managerial techniques was firstly put forward by the State Economy Committee in 1984 (Rei, 1997: 219). Human resource management (HRM) was introduced into China in the late 1980s. The implementation of modern management techniques in China attracted the attention of foreign researchers. Of particular interest is HRM, related to three system reforms--the lifetime employment system, the wage system and the social insurance system. Some authors speculated that management techniques from more developed economies would be applied in the Chinese context (Shore *et al.,* 1993; Tsang, 1994; Warner, 1996, Ding *et al.,* 1997). For example, in *Management in China during the Age of Reform* (1994), Child points out that the Western management techniques are too culturally infused with Western values to yet be on the Chinese agenda for reforms. On the other hand, in *The Management of Human Resources in Chinese Industry* (1995), Warner suggests that human resource management in China may tend towards a more hybrid form combining Chinese management characteristics with either Western or Eastern practices.

Lean production was spread into China in 1991 when the Chinese version of *The Machine That Changed the World* (Womack *et al.*, 1990) was published. Several companies claim that they have implemented lean production techniques since 1993, but few studies of them can be found in any literature, and there is no published research in English that has sought to examine lean production in Chinese industry.

This thesis is set in the context of the Chinese economic reforms and increased FDI, and explores the implementation of lean production in the Shanghai auto industry. It hopes to throw some light on the implications of these processes for the labour process, work organisation and employment relationship.

1.2 Research on Lean Production

1.2.1 Origins of the Term 'Lean Production'

The origin of the term 'lean production' is found in the one of the most influential books in recent years, *The Machine that Changed the World* by Womack, Jones and Roos (1990), the authors of the International Motor Vehicle Programme. Their study lasted five years and cost $5 million, and it surveyed global vehicle assembly plants. It firstly reveals that the secret weapon of the Japanese, who had been able to move ahead of the rest of world in the global auto wars, is a management technique called lean production, as Womack *et al.* (1990: 225) contend:

> Lean production is a superior way for humans to make things. It provides better products in wider variety at lower cost. Equally important, it provides more challenging and fulfilling work for employees at every level, from the factory to headquarters. It follows that the whole world should adopt lean production, and as quickly as possible.

The principles of lean production extend to the entire production system, including design, supply management, work organisation and markets. The following discussion, however, is limited to its production practices and system of work organisation. In general, 'a properly organised lean-production system does indeed remove all slack--that's why it's *lean*' (Womack *et al.*, 1990: 101) and lean

producers 'set their sights explicitly on perfection: continually declining costs, zero defects, zero inventories, and endless product variety' (ibid.: 13). The slack mentioned above refer to unused work time, excess workers and excess inventories.

In the production system, the 'leanness' can be achieved by following the prescribed pathways:

(1) JIT production and reduction of inventories. Lean production requires 'keeping far less than half the needed inventory on site' (ibid.: 13), making small batches which eliminate the carrying cost of the huge inventories of finished parts required under mass production (ibid.: 53). It requires a smooth production, 'the parts went on more smoothly and the work tasks were better balanced, so that every worker worked at about the same pace' (ibid.: 79). The accurate coordination of the flow of parts into each stage of the manufacturing process contributes to cost reductions.

(2) Elimination of defects. Operators are required to 'do it right the first time' and to find errors before they become defects on the production line. 'Once a defective part had become embedded in a complex vehicle, an enormous amount of rectification work might be needed to fix it. And because the problem would not be discovered until the very end of the line, a large number of similarly defective vehicles would have been built before the problem was found' (ibid.: 56).

(3) Minimising cost. 'Cost comes first' (ibid.: 141), in order to achieve target costs, 'both the assembler and the supplier use *value engineering* techniques to

break down the costs of each stage of production, identifying each factor that could lower the cost of each part' (ibid.: 148).

Furthermore, Womack *et al.* indicate two key organisational features of the truly lean plant:

> *It transfers the maximum number of tasks and responsibilities to those workers actually adding value to the car on the line, and it has in place a system for detecting defects that quickly traces every problem, once discovered, to its ultimate cause.* .....So in the end, it is the dynamic work team that emerges as the heart of the lean factory (emphasis in original, ibid.: 99).

This means 'indirect' labour (supervision, inspection, maintenance) is pared down and specialised job classifications are reduced or eliminated and replaced by teams of cross-trained production workers who rotate jobs and take on responsibilities for quality control, repair, housekeeping, and preventive maintenance. Workers in a lean production plant have the opportunity 'to think actively, indeed proactively' to resolve workplace problems. This 'creative tension,' as Womack *et al.* call it, makes work in a lean production plant not only more challenging, but more 'humanly fulfilling' (ibid.: 99-102).

Having given the explanation of lean production as suggested by Womack *et al.*, we look at the term lean production as used in a wider field. Lean production was pioneered within the Japanese car manufacturing sector, although not exclusively, by Toyota Motors (Womack *et al.*, 1990: chapter 3), nevertheless, the term Toyota Production System (TPS) has been used by a considerable number of researchers (Schonberger, 1982; Monden, 1983; Shingo, 1988). Moreover, when

the Japanese economic miracle was investigated by Western countries in the 1980s, it led to its emulation around the world. There have been many different terms previously used to describe the same phenomenon or part of it, i.e. JIT, 'flexible specialisation' (Piore and Sable, 1984), 'Toyotism' (Dohse *et al.*, 1985), 'flexible firms' (Atkinson, 1987). For example, Voss and Robinson described JIT as an umbrella term to refer to a package of techniques, requiring enhanced responsiveness and, particularly, precise coordination of the resources involved in production. So far, lean production is seen as just one of these descriptions, for example, it is composed of various management practices associated with efficient material flows, improved quality and increased employee involvement systems (White and Prybutok, 2001: 113).

However, several researchers indicate that the concept of lean production as codified by American researchers has been developed in several ways. Firstly, in terms of technological perspectives, the work of Womack *et al.* is conceptually and empirically 'considerably more advanced than that of Voss and Robinson', 'lean production is seen as a package, an interrelated and mutually supportive set of manufacturing practices capable of delivering Japanese levels of manufacturing performance anywhere in the world, if implemented correctly' (Oliver and Wilkinson, 1992: 10).

Secondly, regarding the trend of globalisation of the economy, lean production is 'the latest account of the progress towards globalisation in the auto sector and by extension, industry as a whole', so that 'the concept of the Japanisation of Western industry is redundant'; 'the lean production model claims

universal applicability, since its protagonists regard it as a technical development without any social or cultural preconditions……' (Stewart and Garrahan, 1997: 225-228). This is seen an advantage compared to the Japanisation paradigm. Beginning in the UK in the late 1980s, Japanisation has been the dominant form within which developments in the auto industry have been judged. The original concept of Japanisation was introduced by Turnbull in 1986 when he referred to production and organisational changes at Lucas Electrical. The main change to production methods identified by Turnbull is a shift to flexible manufacturing utilising JIT production. One of his main suggestions is that the changes in manufacturing methods are creating pressures for changes in the *social* arrangements of production. Turnbull suggests that the success of Japanese management was dependent on a social organisation of the production process intended to make the workers feel obliged to contribute to the economic performance of the enterprise and to identify with its competitive success (Turnbull, 1986).

Finally, the word 'lean' is used in a broad sense. Rather than focussing on production (or manufacturing), 'lean' is regularly associated with the much broader area of management (Benders and Bijsterveld, 2000) and management is seen as part of the production process.

Therefore, lean production is used throughout this piece of work to describe both new work organisation, as Womack *et al.* defined it, which claims to systematically relate to superior productivity and quality, and its concrete

production techniques including: JIT, kanban, team working, continuous improvement (kaizen) and so on.

1.2.2 Debates on Lean Production at Work

1.2.2.1 Transferability

Lean production is unambiguously described by its proponents as universally adoptable, 'applicable anywhere by anyone', and lean production can be transplanted successfully to new environments (Womack *et al.*, 1990: 9; 84).

This has evoked enormous academic debates on the transferability of lean production from a variety of perspectives. The transferability of lean production is associated with the different social and economic environments between Japan and other countries, because lean production stems from Japanese car manufacturing. For example, some authors point out that Womack *et al.* ignore different market environments when they come to their conclusions. Williams *et al.* (1992) argue that it is an erroneous view which takes for granted the omnipotence of management in its ability to control the business environment. Berggren (1995: 89) notes the importance of understanding the complex relations between management practices and market dynamics. He indicates that Womack *et al.* erroneously attributed stable production expansion and lack of cyclicality in Japanese markets to the production system, and completely overlooked the importance of macro economic factors.

Both advocates and critics of lean production have focused on its social embeddedness (Florida and Kenney, 1991, 1993; Elger and Smith, 1994; Graham,

1994; Oliver and Wilkinson, 1992). Some of the strongest proponents are Kenney and Florida. They support the view of Womack *et al.* that Japanese organisational practices constitute a new form of lean production toward which firms all over the world are converging (Florida and Kenney, 1993: 383). They insist that not only is the Western emulation of Japanese management necessary in terms of advancing industrial efficiency but it is also an *inevitable* outcome of the capitalist dynamic of technological and organisational progress. They conceptualise the new model of Japanese work organisation and production within a framework of '*innovation-mediated production'*, with general applicability, characterised by the active mobilisation of the knowledge and intelligence of all employees. Their research suggests that management has been successful in transferring the Japanese model to the US. They argue that large, resource-rich, powerful organisations have sufficient resources to transform their environments to suit the organisation's needs.

However, despite the fact that the analysis of Florida and Kenney gives much greater attention to the social relations between capital and labour, some researchers point out its weakness. Elger and Smith (1994: 4) argue that 'their characterisation of innovation-mediated production collapses together the social relations of the research and development process and those of the much more constrained exercise of initiative in shop floor improvements'. Babson (1995: 14) indicates that Kenney and Florida 'seem to be describing an *idea type* rather than an actual production system' (emphasis in original). Graham (1994: 124) indicates that because the analysis of Florida and Kenney 'is one sided and top down, the dynamics of how those structures operate, when mediated by the workforce, is

missing'. The lack of empirical evidence of the relationship between engineers and production workers is another weakness of Florida and Kenney's work.

In analysing the universalistic model, Oliver and Wilkinson give a less critical comment on lean production in their influential book *The Japanisation of British Industry* (1992). According to Elger and Smith (1994: 7), on the one hand, they emphasise that lean production does require very specific social conditions, of the sort provided by the Japanese social structure, for them to work, because of the levels of worker commitment they require and their potential vulnerability to disruption by both workers and suppliers. On the other hand, they argue that Japanese production paradigms could successfully be adopted through the construction of 'functionally equivalent' workplaces and labour market institutions which would sustain Japanese manufacturing systems with little compromise in different national settings. By assessing the limitations to the authors' methodology, Danford (1999: 6) points out 'rather than rely on quantitative analysis to construct a facile functionalist fit between different sets of management practices we need to examine exactly how such innovations function on the shop-floor'.

Whilst some of these scholars emphasis the theoretical approaches necessary to construct a lean production paradigm and to substantiate the process of management globalisation, many others focus on case studies of Japanese transplants in North America and Europe (Milkman, 1991, 1997; Garrahan and Stewart, 1992; Babson, 1995; Rinehart, Huxley and Robertson, 1997; Danford, 1999; Delbridge, 1998). Their case studies do not support the universal view

because of the different social and economic circumstances, such as industrial relations, sector conditions, market dynamics and corporate strategies in different countries although most countries do have some examples, at least, of 'new' management practice.

So far, however, there is no research on the transformation of lean production into China. Several important questions arise: to what degree has Chinese management adopted lean production techniques in order to improve competitive capability in the market economy? How has lean production been implemented in the public sector where people have different ideological, behavioural and skill characteristics from those in the developed capitalist countries? How does the Chinese economic and social environment affect the transfer of lean production?

1.2.2.2 Management Prerogative

The most obvious point of contention is whether management prerogative remains present in the labour process under lean production. Proponents of lean production present it as a new cooperative work force participation-based model. Team working and Kaizen are, in this view, mechanisms contributing to workers' participation. Womack *et al.* suggest that the 'team at the heart of plant' is a company-wide team culture premised on the concept of egalitarianism. At the same time, lean production 'transfers the maximum number of tasks and responsibilities to those workers actually adding value to the car on the line', in turn, workers commit themselves to continuously improving productivity and quality (Womack *et al.*, 1990: 99-102). Kenney and Florida (1993: 16) take a step further and suggest

that the 'underlying organisational feature' of lean production is the 'self-managing work team'. Moreover, MacDuffie (1995) notes that the logic of production under the lean system necessarily empowers workers by placing them at the centre of factory operations.

These advocates challenge the predominant Marxist analysis of advanced capitalist society. Their studies are theoretically opposed to the work of Braverman (1974) and Gramsci (1970). In analysing the production of surplus value, Braverman in his *Labour and Monopoly Capital* (1974) points to the imperative of direct management control under scientific management. As he observes, management separated conception from execution and used 'this monopoly over knowledge to control each step of the labour process and its mode of execution' (Braverman, 1974: 114; 119). 'Gramsci (1970) formulated the concept of hegemony to help understand the dramatic changes in the shape and character of power in advanced capitalist societies since the early twentieth century. ...Gramsci defined hegemony as the rule by an alliance of class factions based on a subtle mixture of coercion and consent. Class power, he argued, was always backed by coercive instruments, but had increasingly become masked and fortified by methods of securing the consent of the underclasses to the ruling group's world view' (Yanarella and Green, 1996: 4). Similarly, Burawoy (1985) characterises the Japanese factory system as a form of 'hegemonic despotism'.

Whilst proponents of lean production tend to obscure management prerogatives in the labour process, critics have argued that 'the social relations of production that surround them rely on the assertion of managerial prerogatives to

the detriment of the workforce, which is even further subordinated than it was under previous manufacturing regimes' (Oliver and Wilkinson, 1992: 10). In discussing Toyota's advantage, Dohse *et al.* (1985: 141) conclude that the labour process under Japanese production management 'is simply the practice of the organisational principles of Fordism under conditions in which management prerogatives are largely unlimited'.

A number of quantitative and qualitative research studies, contrary to the views of Womack *et al.,* demonstrate the existence of management prerogative, in a new form of management control, at the point of production under the lean production regime. From their point of view, team working is a new form of control which relieves management of this direct responsibility by imposing the supervisory functions on workers. Graham (1996: 72; 74) points out that this control involves 'an active campaign to create a company-wide team culture premised on the concept of egalitarianism' and the 'pressure existed because of the team structure'. Garrahan and Stewart (1992) find that peer pressure on team members, through 'neighbour checks', is one of the conventional control methods in Nissan's English factories; and direct control is exerted through the team concept by the team leader. Direct control is (effected) through the detailed supervision of workers, constant pressure to meet production goals and the implementation of management directives (Robertson *et al.,* 1992). One of the team leader's responsibilities is to monitor team members' quality of work performance, 'including the identification of individual responsibility for errors', as Delbridge (1998: 52; 29) observes, 'each operator marks their work with a colour-coded paint to indicate who has personal responsibility'.

In the case of Mazda at Flat Rock, a transplant in the United States, management's direct control over work has been protected by a collective bargaining agreement. Under this agreement, team members can not alter their work pace without supervisory approval (Babson, 1996: 84).

Dohse *et al.*, (1985: 142) criticise the fact that worker 'participation occurs in a controlled context in which the topics, goals, and forms of articulation are, for practical purposes, limited to company interests'. Some critics indicate that managers employ participation strategies because they reduce conflict and encourage commitment by engendering feelings of involvement on the part of employees without challenging managerial prerogatives (Hardy and Leiba-O'Sullivan, 1998; Harley, 1999). Graham's (1996) research of US--Subaru-Isuzu, examines how worker participation in the team culture began with the selection process, continued through orientation and training, and was ultimately played out on the shop floor. She reveals, however, the contradiction between the company's egalitarian philosophy and the realities of the team concept: the responsibility of team membership often forces workers to push themselves to the limit in order to keep up. This 'represents an extension of management control on the shop floor, rather than an increase in worker participation and autonomy' (Graham, 1996: 80).

With the same critical perspective, some authors use the word 'hegemonic' from Gramsci's hegemonic analysis to explore the operation of lean production in Japanese transplants and joint ventures (for example, Dassbach, 1996; Yanarella, 1996). They argue that lean production processes are permeated by hegemonic management control mechanisms, involving them in kaizen processes to

appropriate their intellectual capacities and shop floor knowledge as well. Workers are encouraged to suggest improvements or modifications to their work routines but this 'pseudo-participation' occurs within an environment that is rigidly and autocratically controlled by management. Individuals cannot innovate on their own initiative. Management and team leaders decide which work procedures will be modified and how they will be modified, and all changes must be cleared by several layers of management before they are implemented (Dassbach, 1996: 24).

Furthermore, some critics assert that, in essence, the existence of management prerogative is because of the fundamental clash of interests and imbalance of power between managers and employees. Workers' capacity to make decisions is limited, leaving them only free enough to participate in escalating their own exploitation (Berggen *et al.*, 1991; Dohse *et al.*, 1985; Parker and Slaughter, 1988; Turnbull, 1988).

Others have described cases where the individualising and fragmenting consequences of lean production's hegemonic processes upon workers have been able to continue with impunity unobstructed by union mediation (Yanarella and Green, 1996: 12). For management, ideally, the kaizen process is a means of instilling in the workforce a sense of empowerment, an attitude that can reduce workers' likelihood of resisting (Rinehart *et al.*, 1994: 156). Graham (1994, 1996) gives examples of collective and individual spontaneous worker resistance in a non-union plant.

Unlike developed countries, China had experienced a planned economy where the 'organised dependency' of workers on their work unit was described in Walder's conceptualisation of communist neo-traditionalism. Under such 'managerial paternalism', Chinese workers enjoyed life-time employment and egalitarian principles of remuneration (Mok and He, 1999: 68). China's economic reforms, however, broke the 'iron rice bowl' and enhanced managerial authority (this will be discussed in the next chapter). Management now has power to dismiss workers and to decide workers' pay. Workers have found themselves in a disadvantageous position in terms of their status in the society. There is, inevitably, a trend of decreasing 'organised dependency' and an increasing worker dependence on managers (You, 1998). This thesis makes a contribution to the debate by examining if there is management prerogative when managers implement lean production and if managers intend to achieve high profits with a mixture of coercion and consent.

1.2.2.3 Intensification of Labour

Whilst Womack *et al.* saw lean production to be a superior technique, they did not mention its impact on workers or the quality of working life. Danford (1996: 4) indicates that the interests of labour are not the central concern of Womack *et al.*'s research, 'the interests of capital are, and in particular, the labour productivity gains that might accrue to Western manufacturing firms by adopting the Toyota lean production model'. This is echoed by other authors. For example, Stewart (1997: 229) indicates that the lean production paradigm failed to offer a useful description of recent management changes (including the impact of these on employees) or a

realistic prescription of what could be done to engineer changes. Milkman (1997: 15) also indicates that none of the considerable resources supporting the research of Womack *et al.* was used to investigate blue-collar workers' own evaluations of the lean production system.

Kenney and Florida (1988) clearly break with Dohse and his colleagues, who explain Japanese success in terms of the super-exploitation of labour. They argue, instead, that the objective of JIT is to increase productivity through 'increased technological efficiency' rather than the exploitation of labour (1988: 136). According to Womack *et al.*, lean production requires 'half the human effort in the factory' compared to traditional mass production. Moreover, kaizen will eliminate waste motion and fill idle time and it should, therefore, be possible to make work less hard. They are heralding lean production as promoting a significant improvement in the quality of working life.

These claims, however, have been challenged by several authors (Oliver and Wilkinson, 1992; Garrahan and Stewart, 1992; Robertson *et al.*, 1997; Graham, 1995; Berggen, 1995; Danford, 1999) who hold the view that lean production has a negative impact on workers, including the intensification of labour, and it is an inevitable outcome of management prerogatives. According to Elger and Smith (1994: 86), the 'management prerogative is used ruthlessly to maintain long hours and intensify the work pace in an industrial relations system where there is virtually no possibility of individual or collective worker dissent or resistance'. Parker and Slaughter argue that workers mainly 'participate' in the intensification of their own exploitation, mobilising their detailed knowledge of the labour process to help

management speed up production and eliminate wasteful work practices (cited in Milkman, 1991: 70). Berggren (1992) also points out that 'the rhythm and pace of work on the assembly line is more inexorable under the Japanese management system than it ever was before' (cited in Rinehart *et al.*, 1996: 118). Babson (1996: 89) reports on a survey of Mazda workers who claim that lean production and Kaizen demand *more* effort, not less; and three out of every four respondents reported their workload as being 'heavy'.

Critics give several reasons why lean production makes workers more exhausted. Firstly, the work intensity is the direct result of the system and the organisation of work it specifies: no buffer inventories, detailed work methods closely calibrated to the real work situation, level production, rapid response to any breakdowns and error-proofing of the process (Adler, 1995: 213). Moreover, 'the transfer of indirect production activities to workers without increasing the time allocated intensifies work and leads to savings in indirect production personnel' (Dorhse *et al.*, 1985: 130). In his case study in an auto components factory in South Wales, Danford (1998: 417) observes, 'team members moved from machine to machine rather than "owning" a single machine. They became involved with inspecting and testing their work, ordering materials and inputting information into the plant's computerised stores system'.

Kaizen, particularly, is a means to continually increase work tasks and to close up the pores of the working day, ideally to the point where workers operate for sixty seconds in every minute. Through the kaizen process workers are expected to come up with ideas for eliminating non-value-added labour. Kaizen may result in

great efficiency without additional labour input, but any idle time created by kaizen can then be filled up with other tasks. Kaizen does not translate into lighter workloads, instead, kaizen causes heavy work.

Moreover, kaizen involves 'lean staff', namely, a reduction of the size of the workforce. The purpose of kaizen is to remove wasted human effort in order to save labour costs. Research by Rinehart *et al.* indicates that lean staffing was exacerbated by CAMI's (CAMI, a GM-Suzuki joint venture in Canada) penchant for continuous improvement. 'Kaizen dictated the continuous increases in line speed without adding workers' (Rinehart *et al.*, 1996: 112). The reductions in the workforce resulted in work of remaining workers being made harder and faster. If a worker was absent, there were no replacements. Instead, his or her team members had to either work faster or, if they were working at their limits, had to work longer to meet the quotas (Dassbach, 1996: 27).

Parker and Slaughter argue that lean production is designed to obligate workers to intensified labour in a system called 'management by stress'. Under this system, workers are stressed because any failure in the process is immediately exposed and magnified (Parker and Slaughter, 1995: 44); workers worry about their job security as well: whilst the temporary workers fear layoff, the core workers 'do have to worry about a permanent plant closing' (ibid.: 49); so 'stress becomes a vital management tool both for monitoring and for forcing all personnel to keep up' (ibid.: 44). In the end, 'individuals also have good reason to fear that they will not be able to survive the intensified work pace' (ibid.: 49).

Milkman, in her recent book *Farewell to the Factory* (1997), studies auto workers in the late twentieth century where new model lean production was applied. She discloses that few GM-Linden workers who left the factory are nostalgic, in large part because they mostly yearned to escape the relentless and dehumanising rhythms of the assembly line (Milkman, 1997: 12).

Intensified labour leads to an increase in injuries and negative impacts on the health of workers. Accidents are common because the heightened tempo of production causes workers to rush around the factory and take unnecessary risks. The survey conducted by Babson shows that 73% of Mazda workers said they would be injured or worn out before they reached retirement if they sustained their present work intensity. It concludes that, compared to earlier mass production, 'lean production is at least as dangerous to the health and safety of production workers, if not more so (Babson, 1996: 90).

Some commentators have criticised the lean production system, pointing out the ways in which lean production can increase the pace and pressures of work, but there has been little effort to document systematically the views of ordinary workers (Milkman, 1997: 15). Milkman seeks 'to put workers' own experiences and voices at the centre' (Milkman, 1997: 191).

A number of questions arise about Chinese workers. Do they perceive lean production to heighten work intensity and stress? How does Chinese management utilise lean production techniques to control the pace of work? What are the specific social processes in China that affect workers' ability to accept intensified

work? What are workers' viewpoints on the impact of lean production on their health and safety? If Chinese workers suffer from hard work, what can trade unions do to protect the interests of workers?

1.3 Structure of the Thesis

This thesis reports the findings from my survey and a case study carried out in the Shanghai public sector. The general goal of the research is to contribute to an understanding of the implications of economic globalisation for management, workers and their unions. In particular, it is concerned with management's knowledge of modern management techniques in Shanghai industries, and the changes taking place in the auto industry where managers have implemented modern management techniques, especially, lean production. It considers the impact of lean production on workers employed in the auto industry in China.

The thesis is divided into two parts. Part one investigates how the globalisation of the economy and of management techniques impacts upon Shanghai managers in the public sector, in terms of their social characteristics, their situations and their knowledge of such techniques. Firstly, it examines managers' ages, gender, social origins and education levels and provides a foundation to look at how these factors have affected managers' knowledge of modern management techniques. Secondly, it analyses how managers are affected by economic reforms, payment system reform and employment system reform, in order to advance an understanding of the economic and social context. Finally, it explores the extent to which managers have knowledge of modern management techniques. It also

examines the sources of their knowledge and finds out how economic and social factors have affected managers' abilities to receive and disseminate knowledge.

Chapter 2 seeks to examine how social relations mediate the implementation of new management techniques by describing managers' social characteristics including managers' origins and backgrounds. It also explores the managers' situations in the process of economic globalisation. My survey involving 24 companies and 1,012 managers indicates the changing trends in terms of management's power, pay and job security. A summary of the research methodology employed is provided in Appendix A.

Chapter 3 investigates managers' knowledge of modern management techniques and their views on these techniques and it seeks to answer these questions: what do managers know of such management techniques? What channels make it possible for managers to access international developments in management theory and practice? How do managers view modern management knowledge?

Part two concentrates on the case study of the Shanghai Automotive Industry Corporation (Group) (hereinafter referred to as SAIC), with particular reference to eight component suppliers and one bus factory. The case study provides insights into lean production practices and its impacts on workers in the auto industry. Firstly, it examines the reasons why management in SAIC introduced lean production. Secondly, it examines how lean production was implemented. Finally,

it analyses how lean production impacted on the labour process, work organisation and employment relations.

Chapter 4 is an introduction to the company--SAIC and its components companies. It establishes the context of the introduction of lean production in SAIC and components companies in particular, and the Chinese auto industry in general. It will show that the component suppliers were under pressure to implement lean production following its implementation in a core car manufacturing enterprise, which is a joint-venture company. The chapter also outlines the process and characteristics of the emulation of lean production.

Chapter 5 looks at the application of lean production in the production process. It describes how managers build up their lean production systems; where their ideas came from; and what they did. It discusses the underlying reasons for the introduction of lean production. It also provides an initial account of how managers and workers viewed the resultant changes. The initial attempt of management was to increase productivity through increased technological efficiency and decreased inventories. However, this necessarily involved stricter management control.

Chapter 6 uses survey data to disclose, in detail, how the application of lean production heightened work intensity and work related stress. It will be seen that most workers reported that their jobs made them work very hard, one quarter of workers thought they never seemed to have enough time to get their job done and two-fifths of workers worried a lot about their work outside working hours. There is also a comparison between the views of Chinese workers and British workers,

utilising data from the British 1998 Workplace Employee Relations Survey (WERS 98). This chapter documents how some specific management techniques in labour utilisation and work pace control resulted in the intensification of labour. Finally, the chapter assesses the both positive and negative impact of lean production on workers' health and safety.

Chapter 7 addresses the changes taking place in work organisation, with an emphasis on the application of team working and kaizen. This chapter focuses attention on contested worker participation, new types of management control, and workers' skill levels. Workers' different views on team working, kaizen and training are reported. It reveals how the economy and society in China affected workers' perceptions of the changes in organisation.

Chapter 8 examines the role of the trade unions in both national and enterprise level. The Chinese labour market has been deregulated and management autonomy has provided managers a free hand to deal with labour, ACFTU impose changes to act on behalf of workers' interests. However, unions in the enterprise level are facing problems to make changes. Workers saw unions as part of management, they also complained that unions failed to have any effective impact on management decision making, particularly in workers' pay levels and layoffs.

The conclusion attempts to draw together the threads of the previous chapters, and suggests that this case can be seen as characteristics of the emergence of lean production in a developing country--China.

Part One

Survey of Managers in Shanghai Public Sector

Chapter Two

Managers' Situation during the Economic Transition

This chapter presents a portrait of the managers' situation in the public sector across Shanghai. It investigates key sociological variables including managers' ages, gender, social origins and education levels. This chapter explores changes taking place during the economic transition in terms of managers' power, payment and job security, drawing on an investigation into the views of managers amongst 24 companies in 8 industries of Shanghai. It looks at how managers' perceptions of pay and job security varied in different age groups and job levels, in order to advance an understanding of the complex processes that lay behind their social polarisation.

2.1 Social Characteristics of Managers

My survey data indicate that management entry into a managerial position was more likely through promotion (68%) than recruitment from outside the enterprises (11%). The dominant way of recent promotion was 'appointment' which was made by both executive and Party members in the company. In addition, a few managers (9%) were elected and, rarely, transferred from other companies. The economic transition led to changes to the constitution of managers in SOEs. The closing or downsizing of SOEs caused a decline in the number of managers in general. The shift of former managers in SOEs to non-public sectors also entailed personnel

changes in the individual company, so it is necessary to give a picture of the social characteristics of managers in Shanghai SOEs.

2.1.1 Age and Job Level

It is essential to have some knowledge of when particular events occurred in order to provide the necessary explanatory information with which to contextualise the findings (Davies, 1994). At the time the research took place (1999), managers were divided into three age categories: up to the age of 35, aged between 36 and 50 inclusive, aged 51 and upwards. Age stratification in this way not only considered the different stages of life course, but more importantly, it reflected the influences of social development in China. I looked at cohorts with different experiences of the Cultural Revolution, which took place from 1966 to 1976 in China.

Table 2.1 shows the age range of each group at selected years. During the Cultural Revolution, the youngest managers, aged up to 35, were up to 12 years old and had not entered secondary school. So they were the least affected by the Cultural Revolution. They had more opportunities to access good education and obtained their first jobs after the economic reforms which started in 1977. They are now moving towards the most productive stage of their life course. Managers in the middle age group, aged between 36 and 50, were teenagers and youths when the Cultural Revolution ended. Some of them lost opportunities to study in universities in their 20s. They are now in the most productive stage of their life course. Members of the third group, who are aged 51 and above, had experienced the Cultural Revolution when they were aged 18 upwards, living in the hard period

when the country suffered great difficulty. They were moving from employment into retirement in 1999 (when the survey was conducted) and are especially vulnerable at a time of economic transition. Amongst the survey sample, around half the managers (52%) were found to be in the middle age group. The youngest managers (29%) constituted the next largest group and the oldest managers accounted for 19%. In general, the average age of managers is 42, the youngest one is 20 years old and the oldest one is aged 64.

Table 2.1 The Age Range of Each Cohort at Selected Years.

Birth year	Age at 1966	Age at 1976	**Age at 1999**
Later than 1963	Up to 2	Up to 12	**Up to 35**
1949--1963	3--17	13--27	**36--50**
Earlier than 1949	18 and above	28 and above	**51 and above**

Managers in industry can be stratified by different administrational levels, namely junior, middle and senior managers. Studies of management in these different levels have revealed different characteristics. For example, one study suggests that middle managers are feeling pressured from above and below; employees are now more questioning of middle managers' decisions and their activities are placed under greater scrutiny from senior managers (Wilkinson *et al.*, 1993). Middle and junior managers may feel themselves to be excluded from 'management' (Scase and Goffee, 1989). In this research, junior managers refer to those who are at the entry level of the managerial hierarchy according to the cadre administration system in China. Middle managers refer to those who are responsible for management at departmental level and are ready for the senior level after several

years. Senior managers refer to those who are at the top of the hierarchy and engage in the overall planning and running of the whole company. In the survey sample, middle managers constitute the largest group, which is 48% of the total, compared with junior managers (40%) and senior managers (12%).

Table 2.2 Distribution of Managers at Different Levels by Age Group.

	Junior (%)	Middle (%)	Senior (%)
<36	46	19	8
36--50	46	54	66
>50	8	27	26

Total N=1,012

From Table 2.2, it can be seen that there is a remarkable disparity in managerial position across age groups. Most senior managers (66%) are in the middle age group. It is less likely that junior managers are aged over 50 (8%) or that senior managers are under the age of 36 (8%). Amongst middle managers, middle aged managers (54%) are almost three times as common as the younger groups (19%) and double the number of older managers.

2.1.2 Birth Place and Gender

Those SOE managers in Shanghai who were locally born in Shanghai (81%) outnumber those from other cities. The second largest group (14%) is from the six provinces in the HuaDong area, which is made up of the nearest provinces to

Shanghai such as Jiangsu and Zejiang. Only 4% of managers come from other areas. For example, the director of Chem-1[1] was born in Jiang xi.

Regarding managers' gender overall, the proportion of male managers (75%) is treble that of female managers (25%). The percentage of female managers is related to the nature of the industry. About one quarter of female managers (24%) are working in the textile industry which, in China, is a female occupation. Very few female managers (around 1%) work in the transportation industry.

Table 2.3 Managers' Distribution by Gender.

		Male (%)	Female (%)
Age	<36	25	40
	36--50	52	52
	>50	23	8
Job level	Junior	34	59
	Middle	52	35
	Senior	14	6

Total N=1012

Table 2.3 provides evidence that female managers in the youngest group (40%) make up five times the number of those in the oldest group (8%). However, the proportion of middle aged female managers (amongst female managers) is the same as that of middle aged male managers (amongst male managers). This may be explained by the fact that more women with high qualifications have been promoted

[1] Each enterprise visited was given a code that is composed of the shortened name of an industrial section and a number which represents an enterprise in this section. These industrial sections are Automotive, Electric, Chemical, Public services, Construction, Textile, Light industry, and Transportation. The first case in the chemical industry is coded as Chem-1.

to managerial positions since the development of the Chinese economy and society. It seems that more women occupy junior level managerial positions (59%) (amongst female managers) than men (35%) (amongst male managers). By contrast, fewer women (6%) (amongst female managers) make up senior manager's positions than men (14%) (amongst male managers).

2.1.3 Father's and Spouse's Occupations

Table 2.4 illustrates that managers' fathers are less likely to have professional jobs (16%) than their spouses (27%). By contrast, the ratio of managers whose fathers are manual workers (41%) is higher than those managers whose spouses are manual workers (26%). Managers may receive more help in establishing networks from their spouses than they do from their fathers. It seems that the occupations of managers' fathers do not have a strong relationship with the managers' careers because 41% of managers' fathers are manual workers, accounting for the largest group.

Table 2.4 Occupational Distribution of Managers' Spouses and Fathers.

Unit: %

	Worker	Professional	Cadre	Clerk	Peasant	Others
Father (n=901)	41	16	16	17	4	6
Spouse (n=758)	26	27	18	21	0	8

It is known that peasants comprise 80% of the Chinese population. However, only 4% of managers come from peasant families. Because the government has set up the 'urban residence registration system' (*hu kou*) to limit peasants' access to urban areas, only those sons or daughters of peasants that have graduated from universities can work in Shanghai SOEs.

A comparison of father's occupations is made between managers at different age groups, as presented in Table 2.5. Younger managers (32%) are less likely to have fathers in manual work than those in the middle age group (46%). This reflects the fact that the occupational inheritance of jobs (*ding ti*) from parents to offspring was phased out in the 80s. Few young managers were recruited in the old employment system.

Table 2.5 The Father's Occupations of Managers by Age group and Job Level.

Unit: %

	Age			Job level		
	<36	36--50	>50	Junior	Middle	Senior
Worker	32	46	40	39	40	46
Professional	25	13	14	17	17	11
Cadre	18	16	11	17	15	18
Clerk	10	18	22	16	16	23
Peasant	9	1	6	5	4	1
Others	6	6	7	6	8	1

Total N=901

It seems that manager's careers are not closely related to their social origin. The fact that a manager's father is a manual worker has not been a barrier to being a senior manager. There is high proportion of senior managers (46%) whose fathers

are workers, compared to middle managers (40%) and junior managers (39%). By contrast, there are lower proportion of senior managers (11%) who came from families with fathers who are professionals, when compared with middle managers (17%) and junior managers (17%).

The managers originating from the working class are conscious of their disadvantaged backgrounds and experience difficulties in their career developments, as Huang stated:

> I was born in Shanghai in 1960. My father is a worker. I got my job cutting rubber in a chemical firm in 1980. After ten years of simple operation and extreme efforts, I got a chance to enter a managerial position (a middle manager in Chem-1).

2.1.4 Educational Background

It has been considered that the educational background of managers is an important social feature. According to China's education systems, elementary and secondary schooling lasts 10 to 12 years. A student in a polytechnic college normally spends three years to gain a diploma. A student in a university can get a first degree after four or five years' successful study. In general, managers who have diplomas (46%) are more prevalent than those who have first degrees (22%). Few are postgraduates (2%) and nearly three out of ten managers have never been to college or university.

The difference in educational level of managers in the three age groups may mirror the changes in manager's qualifications. It is found that younger managers

have a better education than the rest of the groups. It can be observed in Table 2.6 that the youngest managers (42%) who possess a first degree number more than three times those of middle age managers (11%) and about twice those of older managers (23%). The proportion of managers with secondary school education drops from 35% in the middle age group to 17% in the youngest group. Entry into a managerial position has been linked to educational qualifications. The piece of paper--a qualification certificate is increasingly seen as being important.

Table 2.6 Schooling of Managers by Age Group and Job Level.

Unit: %

	Age			Job level		
	<36	36--50	>50	Junior	Middle	Senior
Secondary school	17	35	31	36	24	25
College	36	53	44	42	48	57
University	42	11	23	21	25	15
Postgraduate school	5	1	2	1	3	3

Total N=1,004

On the other hand, it appears that older managers have slightly better educations than middle aged managers because there are twice as many older managers who have first degrees (23%) than middle aged managers (11%). This may be explained by the fact that older managers probably gained their first degree before the Cultural Revolution during which universities closed or stopped recruiting students. After a decade of chaos, universities have returned to normal since 1977. Education at college and university has been increasingly supported by the government. Middle aged managers suffered mostly from this loss. When managers were asked 'how did the Cultural Revolution affect you', 80% of middle

aged managers pointed to their education levels. Some managers obtained qualifications later through arduous part-time study whilst working. Director Hong stated his experience as follows:

> I graduated from secondary school during the Cultural Revolution and I had no chance to go to University. I know, having a degree is a big advantage. I went on to take a part-time diploma course in Law in the TV University (*dian da,* an equivalent of the Open University in the UK) from 1985 to 1988. From last year, I have been studying the Market Economy for a master degree whilst I am at my post. It will last for three years (in Publ-1, 45 years old).

Huang, a middle manager in Chem-1, 38 years old, told his story:

> I went to a primary school in 1967 and graduated from a high school in 1978. I did a part-time diploma course in Enterprise Management in a technology college from 1985 to 1988. You know, in those days, I went straight to the college when I finished my job. It took me two hours by bicycle. I have been studying for a first degree in Economic Management since 1995 part time as well.

Looking at managers at the three job levels, three out of four senior managers and middle managers have a diploma, at least, from a polytechnic college. This means that a degree is insisted upon when selecting a senior or middle manager. The work experience of candidates and work-related training they received is also considerable. However, 36% of junior managers only attended secondary school. This might be because those less qualified managers have been promoted more slowly.

Most candidates for promotion or recruitment require the minimum of a degree in the relevant discipline. About three out of five managers in all three levels have studied a technology related discipline. In this sample, these disciplines are mechanical engineering, electrical and electronic studies, automation and computer skills, chemistry and textile studies. About one-third of managers studied for management at universities. Only a very small proportion of managers studied the social sciences (5%).

2.1.5 Work Experience

In the survey sample, two-fifths of managers worked in the production department including the shop floor; 13% of managers were in the research department; followed by managers who were in the department of personnel (10%); administration (9%) and finance (9%). The length of time spent in their present company and their mobility makes up the features of manager's careers. It is evident that the majority of movement still take place within the public sector. Few managers had been to the countryside (5%) or were members of the military (2%). A small number of managers (6%) had even worked in joint-venture companies. Less than 1% of managers worked in foreign funded or private companies.

The evidence from Table 2.7 shows there is mobility between companies. The percentage of managers who worked more than 30 years (31%) is higher than that of managers who had more than 30 years' service in their present company (19%). By contrast, the percentage of the managers who had less than 11 years' service (21%) is lower than that of managers who had less than 11 years' service in their

present company (31%). Whilst some mobility of managers was due to individual factors, some movement between companies resulted from the restructuring of companies.

Table 2.7 Length of Working Life and Length of Time in Present Company.

Number of years	Length of working life (%) (n=1,011)	Length of time in present company (%) (n=1,008)
10 and below	21	31
11 to 20	19	31
21 to 30	29	19
31 and above	31	19

To sum up, although the educational level of managers in the Shanghai public sector is not high overall, there has been a considerable change in the manager's educational levels. Those male managers who come from working families and possessed at least a diploma are dominant in Shanghai SOEs. In spite of their social origins, these managers are undertaking the most difficult tasks to sustain the state economic base.

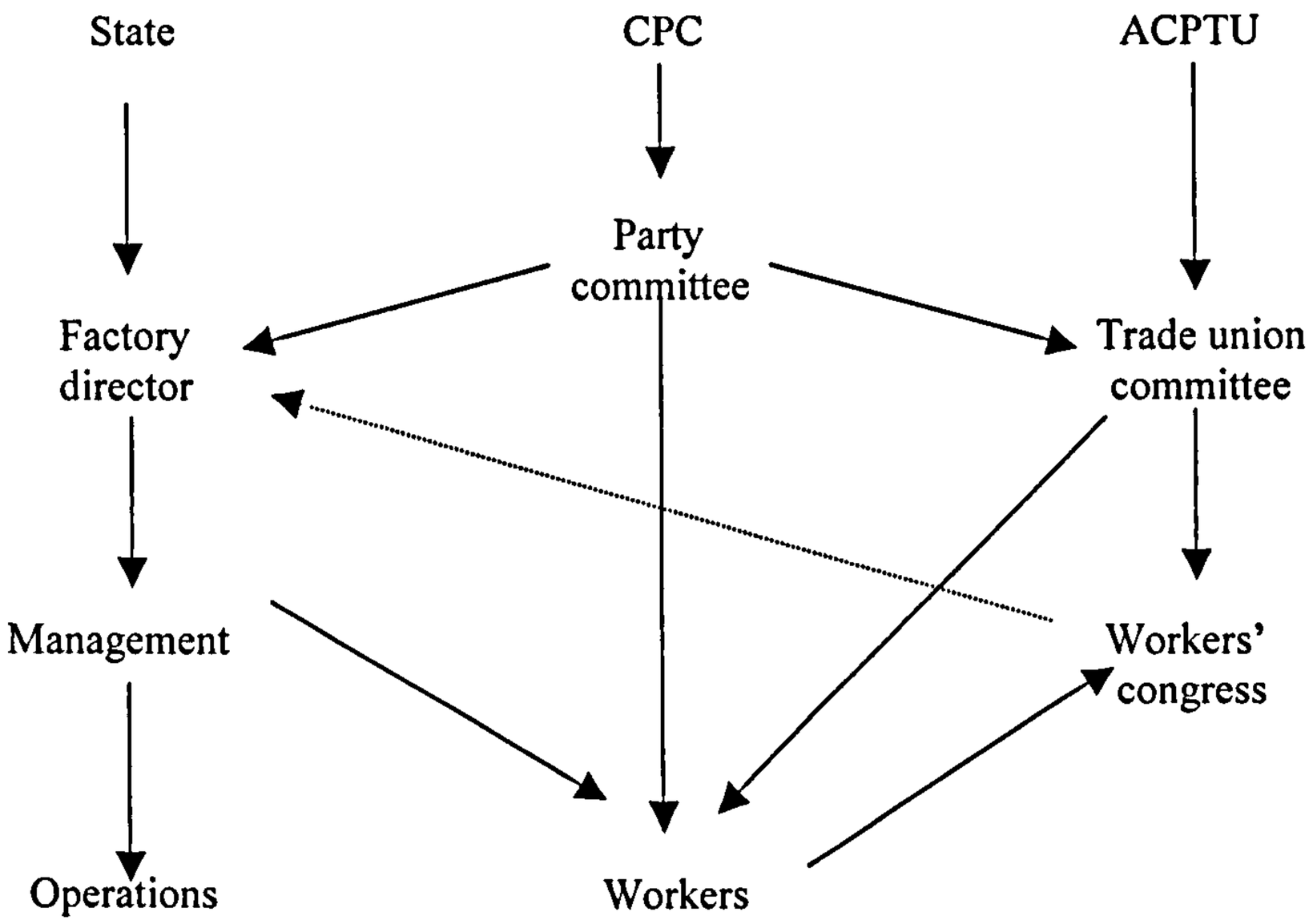
2.2 Determinants of Managerial Power during the Economic Reforms

2.2.1 'Director (Manager) Responsibility System' in Its Historical Context

In 1984, the introduction of the 'director (manager) responsibility system' (*chanzhang jinli fuzhezhi*) granted managers significant powers to run enterprises in the market economy. Doubtlessly, this resulted in the changes in the system of

enterprise leadership. Under the previous 'director responsibility system under the leadership of the Party', Party committees had great power to make decisions on key production and personnel affairs. Directors (managers) were mere executors of the decisions made by the committees. Workers' Congresses, for which trade unions acted as agents, also enjoyed some rights of approval over management policy. Key relationships under the 'director responsibility system under the leadership of the Party' are outlined in Figure 2.1.

Figure 2.1 Key Relationships under the 'Director Responsibility System under the Leadership of the Party'.

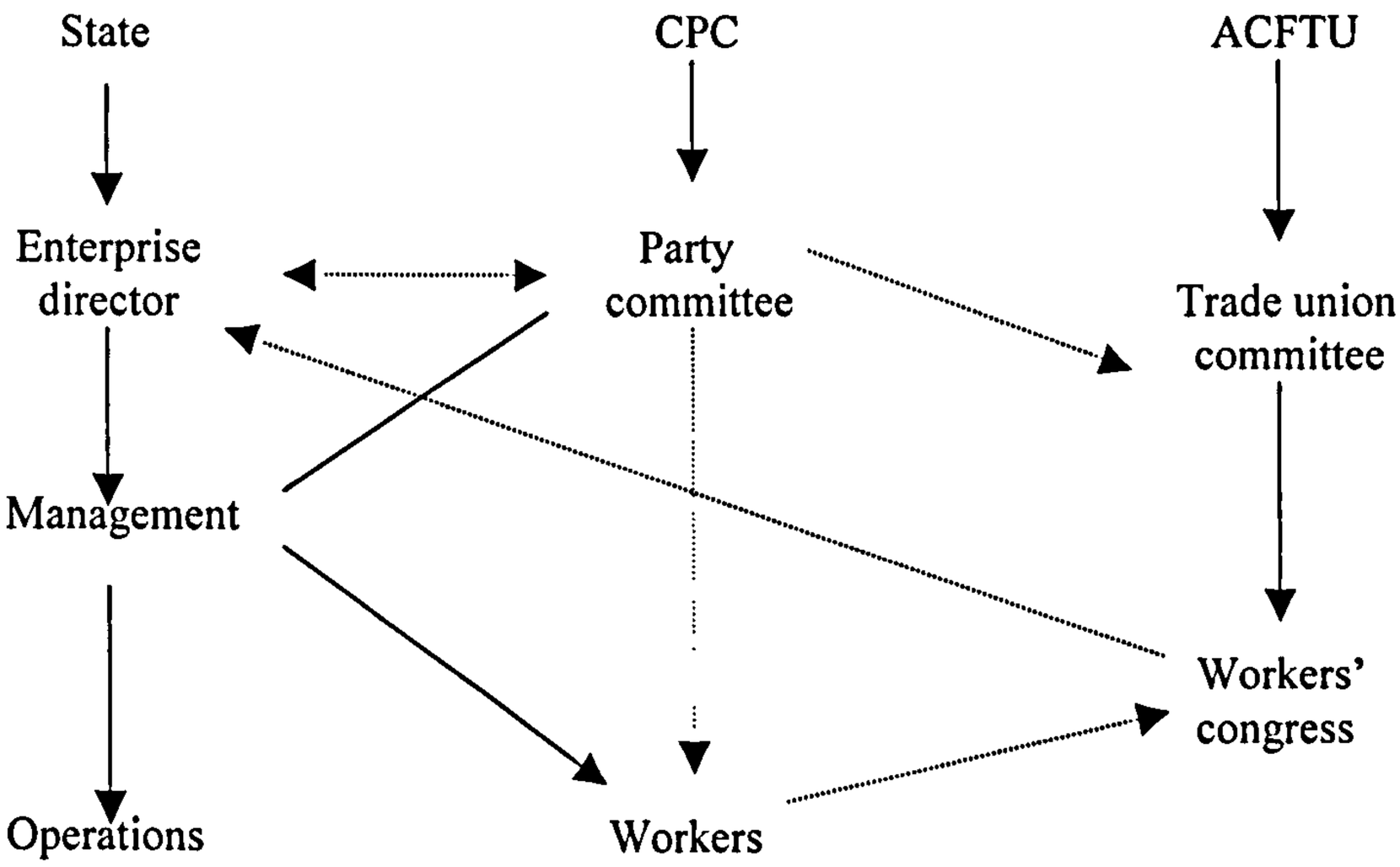


Key: → indicates an authority link; ⋯▸ indicates similar links but of a weak or unclear kind. CPC=Communist Party of China; ACFTU=All-China Federation of Trade Unions.
Source: adapted from Child, 1994: Figure 4.2.

Under the 'director (manager) responsibility system', directors (managers) play a dominant role in running enterprises, the Party committee no longer serves as the leading organ in enterprises. Party committees actively assist directors in their authority and supervise the implementation of government policies. According to the Enterprise Law of 1988, the Workers' Congress is the highest legitimate body

within a state owned enterprise and has limited power in relation to management, including receiving reports from directors and discussing general strategic issues. In practice, however, the Workers' Congress hardly ever oversees directors, and their decisions may be rejected by management. The unions, under the leader of the Party, are not perceived as an independent political force within enterprises and have became weaker due to the decline of the Party's role. Key relationships under this system are shown in Figure 2.2.

Figure 2.2 Key Relationships under the 'Director (Manager) Responsibility System'.

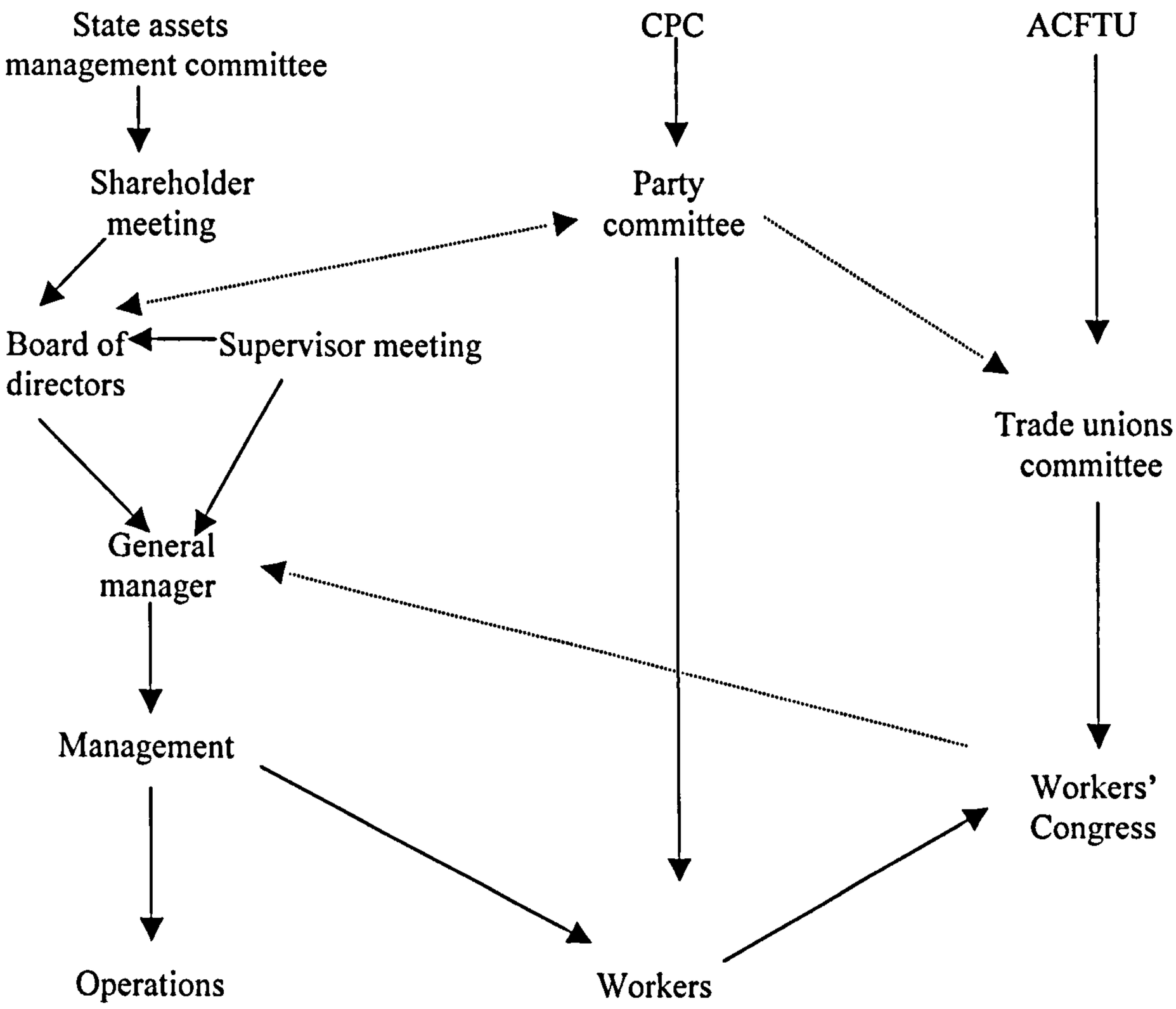


Key: → indicates an authority link; ◄┈┈► indicates reciprocal links of authority or influence; ┈┈► indicates similar links but of a weak or unclear kind. CPC=Communist Party of China; ACFTU=All-China Federation of Trade Unions. Source: adapted from Child, 1994: Figure 4.3.

In 1993, the central government and the CPC decided to establish a 'modern enterprise system' (*xian dai qi ye zhi du*), namely, the corporate system (*gong si zhi*), in an attempt to restructure property rights in SOEs, through transferring the existing assets into shares, absorbing investments to increase the capital and

reorganising enterprises into limited company and limited share companies (*Shanghai Economy Year Book*, 1995: 28). The Corporate Law, issued in 1993, is the legal basis for setting up companies in China. Figure 2.3 illustrates the key relationships in corporatised SOEs[1]. The new management system was called the 'general managers responsibility system under the leadership of the board of directors' in some corporatised SOEs.

Figure 2.3 Key Relationships in Corporatised SOEs.



Key: → indicates an authority link; ◄┈┈► indicates reciprocal links of authority or influence. ┈┈┈► indicates similar links but of a weak or unclear kind. CPC=Communist Party of China; ACFTU=All-China Federation of Trade Unions.

[1] Strictly speaking, when SOEs are corporatised with diversified equity ownership, they should no longer be regarded as SOEs. However, because the state hold the majority, I shall employ terms such as 'corporatised SOEs' and SOEs in the later chapters.

According to the Corporate Law, the power of decision making comes from shareholders. The policy making body is the meeting of the board of directors who are voted upon by shareholder's meetings, the executive body is the management team headed by the general manager who is appointed by the board of directors, and the supervisory body is the supervisory committee. It is clear that although managers play essential roles, they are theoretically subject to the shareholders. But little change occurred over several years and the process of establishment of the corporate system was slow.

2.2.2 Management Power under the 'Modern Enterprise System'

In Shanghai, the 'modern enterprise system' was formally launched in November 1994 and its framework was initially shaped in 1997. Amongst 250 pilot enterprises in the modern enterprise system, 243 were transformed into the company-system, accounting for 97% and amongst the 2,725 enterprises affiliated to them, 79% completed the transformation. Shanghai approved 102 founder's joint-stock companies, 5 listed companies and 1,923 companies with limited liability (*Shanghai Economy Year Book*, 1998: 30). The municipal administration office of state-owned assets was set up to be responsible for state-owned assets.

In theory, management power in a corporatised company is limited. In reality, however, management power is valid to a large extent in a corporatised company. Three main reasons for this are identified as below. Firstly, the board of directors and supervisory committee have not fully utilised their roles. According to official reports in 1997, amongst 200 enterprises which were carrying out the experiment of

the 'modern enterprise system' in Shanghai, 26% of the enterprises had neither a board of directors nor a supervisory committee. For those enterprises with a supervisory committee, 54% of the committees had not held even one meeting; 42% of them had not examined financial statement; 61% of them had not submitted their supervisory reports and 63% of them had not made the duties of their members clear. In the enterprises with a board of directors, 38% of general managers were not nominated by the chairman of the meeting of board, and 32% of general managers were not appointed by the chairman of board of directors. It is also observed that corporatised SOEs were still 'run as before by supervisory departments instead of shareholders' meetings' (Lau, 2000: 60). Although many SOEs had been formally transformed into the corporate system, in reality it was difficult to find a company that operated in line with the Corporate Law (Jin, 1997: 223).

The second possible reason for the lack of implementation is that chairmen of boards of directors have no strong motivation to enhance the value of state property. For corporatised large and medium-sized SOEs in China, state equity still comprises the overwhelming majority, that is, various property rights of ownership remain in the hands of state organs. A chairman of a board of directors is appointed as a legal-person representative to administrate property rather than as an owner.

Furthermore, managers can make decisions, not only on managerial operations as before, but also on dealing with property because most of them are members of the board. Because of the government policy of 'taking a firm grip on the large, let the small go', more and more state equities are brought together by

merging and restructuring. Hence, a manager may run an enterprise with more and more equities than in the past.

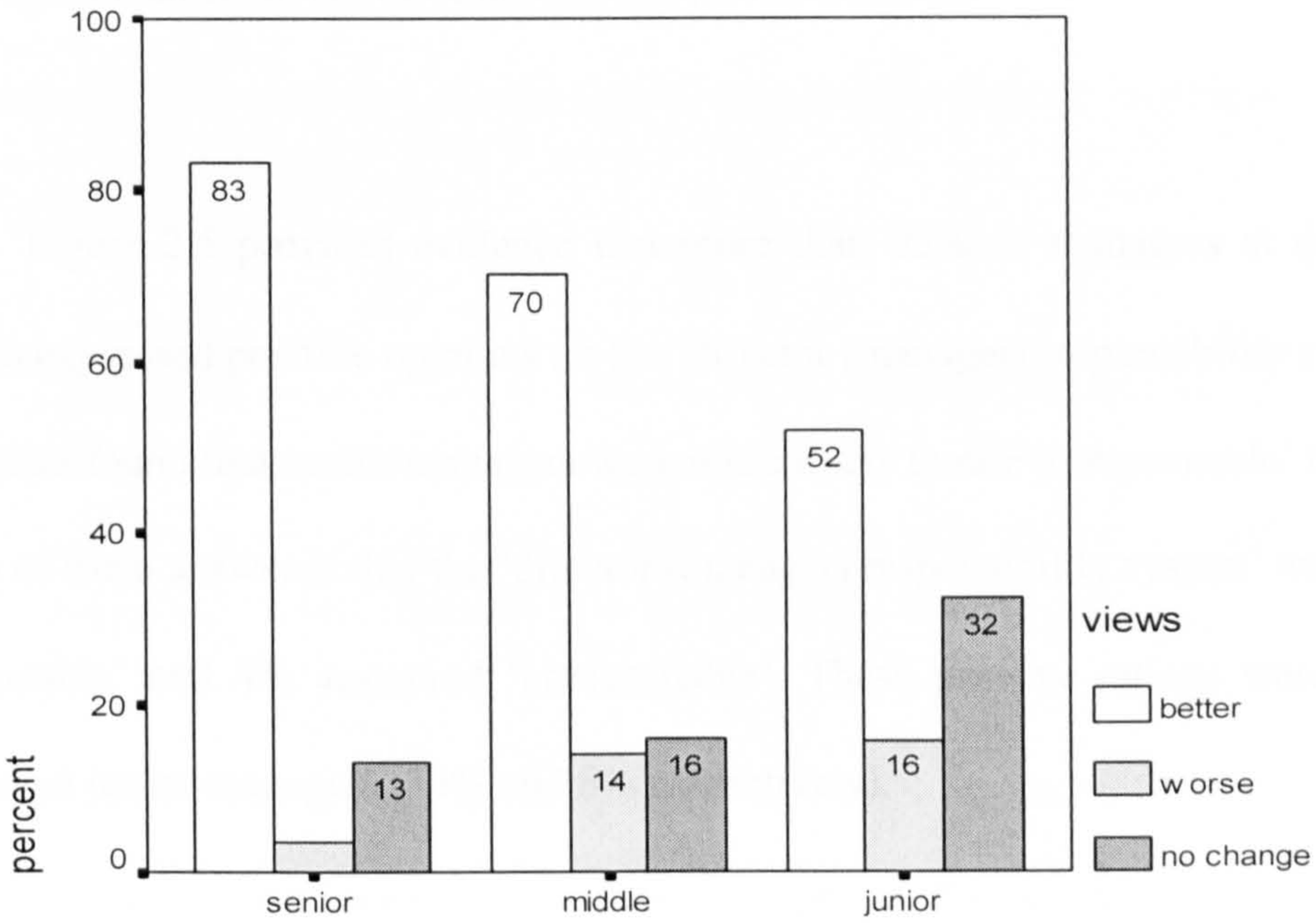
At the time of survey, when the 'modern enterprise system' had only recently been introduced, it was impossible to investigate its operation and to reveal significant shifts in practice. My research shows that general managers or directors still had unique power on many grounds in corporatised SOEs. Middle manager Xu in Publ-1 told me that he and other middle managers only followed what the general manager said. The manager Wang on the shop floor of Text-1 indicated that the 'director (manager) responsibility system' was still applied in the sub-companies or works where general managers checked and assessed the performance of middle managers. Director Fu in Chem-1 was called 'the number one in the firm' because he had great power to make decisions. Chen in Elec-2 gave a detailed explanation:

> In our company, both the chairman of board and the general manager were appointed by higher level officials, this is not in line with the Corporate Law. The development of the company directly depends upon the general manager. The shareholder meeting is only a formal ritual. In those SOEs which have not been transferred to diversified equity ownership companies, directors still play a dominant role (the head of the enterprise management office).

2.2.3 Views on the 'Director (Manager) Responsibility System'

The survey (see Figure 2.4) clearly shows that senior managers (83%) were more satisfied with the reforms in decision making than middle (70%) and junior managers (52%). Senior managers complained less than others. This indicates that senior managers enjoyed great managerial power in corporatised SOEs.

Figure 2.4 Views on Changes in Decision Making by Job Level.



Total N=669

Table 2.8 Managers' Views on the 'Director Responsibility System' and Views on Changes in Decision Making by Age Group.

Unit: %

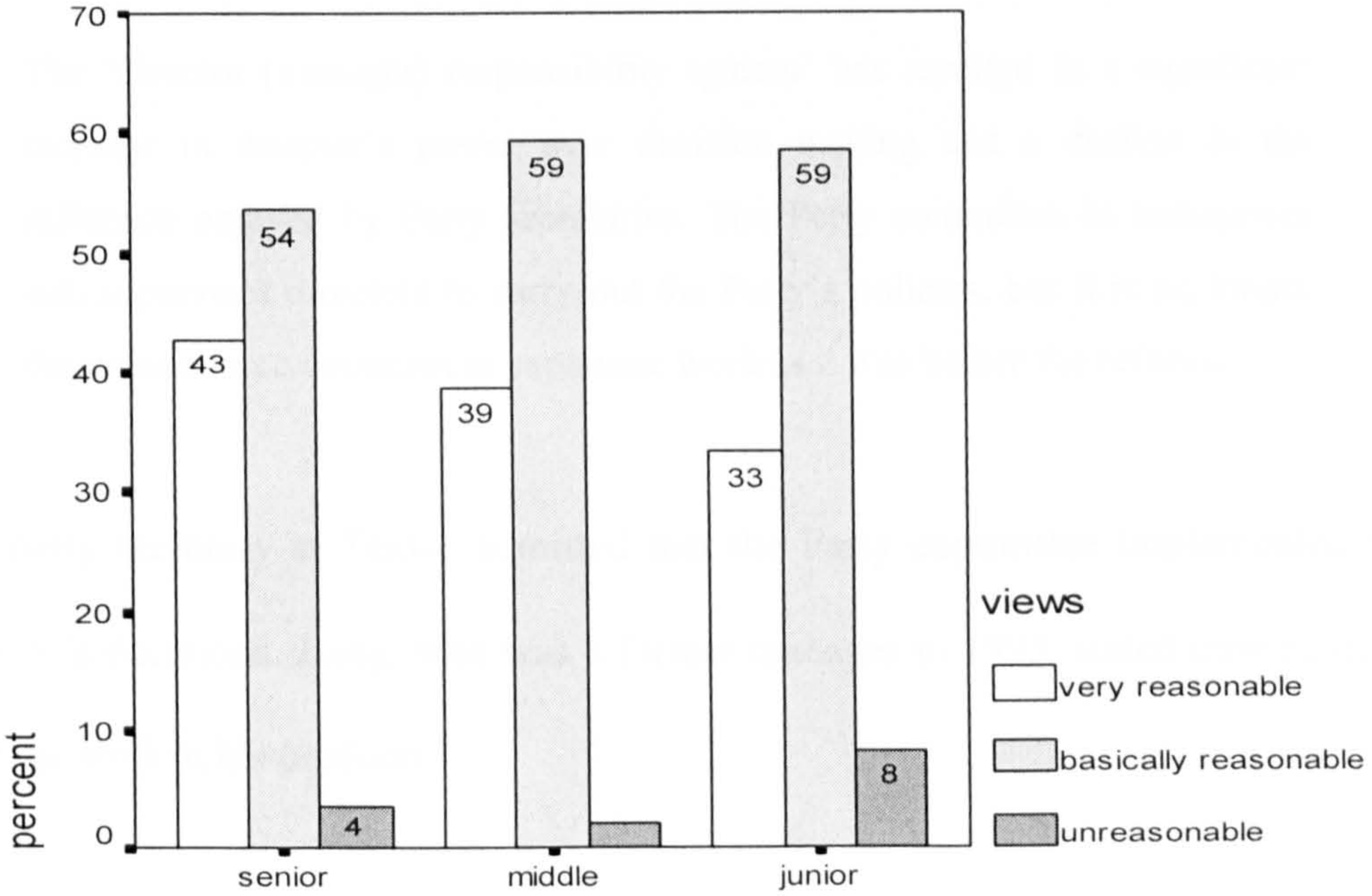
Viable	Views	<36	36--50	>50
Decision making	Better	65	69	60
(n=669)	Worse	8	12	23
	No change	27	19	17
DRS	Very reasonable	39	38	32
(n=891)	Basically reasonable	54	59	63
	Unreasonable	7	3	5

This is in line with the result which found that middle aged managers who felt more involved in decision making (69%) numbered more than those managers in the youngest (65%) or oldest (60%) (see Table 2.8). It reflected the fact that 66% of

senior managers are in the middle age group. In general, there is no big difference between managers in the three age groups (see Table 2.8).

Figure 2.5 provides evidence that more than 92% of managers at different levels expressed positive opinions on the 'director (manager) responsibility system'. It is also found that senior managers were more likely to rate it 'reasonable' because 43% of them answered that the 'director (manager) responsibility system' was 'very reasonable' and 4% answered 'unreasonable'. These positive ratings were lower amongst junior managers (33% and 8% respectively).

Figure 2.5 Views on the 'Director (Manager) Responsibility System'.



Total N=891

The extent to which the Party influences managerial decision-making varies between companies. The Party is still playing an important role in economic affairs

in some SOEs where the Party secretary is also the chairman of the board. In my survey sample, there are at least eight companies where Party secretaries are chairmen of the board. It is an easy way to carry out managerial control, as director Fu in Chem-1 put it:

> I think there is no difference between the Party and administration in my holding company where the Chairman of the board is a Party secretary. In my firm, although I have the right to make important decisions independently, I always discuss these issues with the Party secretary in advance.

In other cases, the power of many party secretaries in enterprises was greatly reduced after the introduction of the 'director (manager) responsibility system'. As Party secretary Wu in Cons-3 indicated:

> The 'director (manager) responsibility system' has resulted in a significant increase in director's power over decision making and a decline in the influence enjoyed by Party secretaries. The Party committee in enterprises still supervises directors to carry out the Party's policies, but it is no longer the unique force dominant in economic work as it was before the reforms.

The party secretary at Text-1 admitted that the Party committee implemented the director's decisions. Jiang, who was a former manager in 1995, stated how he dealt with the shift in his position:

> When I was no longer a manager I felt the loss deeply. I tried to understand the change. Now I can fully support the manager. In fact, the most important thing is to increase the productivity of our company. We will benefit if the enterprise is successful. So it would be useless to see power as very important (the Party secretary in Publ-1).

Whilst some management power remains in the new enterprise system, most managers are particularly worried about the corruption caused by reduced accountability when supervision has not worked well. A middle manager Xu in Cons-3 pointed out:

> The director or senior manager is responsible for the enterprise. He has to restrain himself and be honest in performing his official duties. Some managers and directors abuse their power. Indeed, it is difficult to supervise them.

During the period of my first fieldwork trip (1998), I went to a textile firm, which had a 70 year history and a famous brand of product. It changed from a profit-making firm to a loss-making one dramatically within four years. One of the main reasons was that the former director was arrested because of corruption. He gave permission to a township level enterprise for utilising the famous brand of his firm, in return, he accepted RMB 100,000. As a result, the poor quality of the township level enterprise ruined the brand production of the textile firm. The same thing occurred in a Steel and Iron Company, where the former director put the company budget into his pocket.

The scholars I interviewed were also concerned about the supervision of managers. Professor Li indicated that asset stripping was a common problem in SOEs. State property to the value of 100 billion a year has been lost on average since the 1980s. One of the most serious factors was that managers and officials used state assets for personal gain. In some instances managers mismanaged state assets in a bid, made illegal sales of state assets or undervalued state assets even in

legal sales. Professor Feng, of the Chinese Workers' Movement College (CWMC), which is a major training base of the ACFTU for senior union leaders, emphasised that Workers' Congresses in SOEs should exercise their role of supervision:

> After the Cultural Revolution, some senior managers spontaneously pursued their own interests. They wanted to get compensation for their losses during the Cultural Revolution. Workers' congresses in SOEs should supervise managers. However, the trade unions cannot exercise their power independently (Feng, 1998).

Professor Zhang in Shanghai gave his opinion about the shareholder meeting:

> Shareholders' meetings in corporatised SOEs are theoretically able to exercise their role of supervision by voting for the board of directors and general managers. In practice, managements act as agents of the state to run enterprises, it is easy to create 'inter-personal control'. Some shareholders have no motivation to supervise assessment criterion for good enterprise management (Zhang, 1999).

Previous research carried out by Laaksonen shows that power was greatly centralised in the hands of top management of enterprises, this phenomenon was illustrated in the great power distance between top and middle management in China (cited in Warner, 1995: 150). During my fieldwork, my main impression was that some middle and junior managers did not regard themselves as managers because they had too little power to demonstrate their status. Senior managers had much greater power than that of middle and junior managers in both personal and economic affairs, as Fu pointed out:

The increased difference between managers is an inevitable trend. The key reason is that managers at different levels have different responsibilities and power. Directors are deeply aware of their superiority and power (the director of Chem-1).

To sum up, the 'director (manager) responsibility system' provides the foundation for the new management regime and makes it possible for management prerogatives to be exercised over labour. Management came to have much greater power, not only to modify production technology and work organisation, but also to recruit, promote, reward and dismiss employees. Management prerogatives have not been limited to carrying out the 'modern enterprise system'. Employees remain vulnerable to economic and social changes.

2.3 Disparity of Pay amongst Managers

2.3.1 The Reform of the Payment System

A number of researchers have drawn attention to changes in the payment system in China during the economic reforms (Child, 1994; Mark, 1995; Warner, 1995). In the pre-reform era, characterised as 'organised dependence' (Walder, 1986), employees were highly dependent upon their work units *(danweis),* and the payment system was based on unified planning made by the government. All people had to share an equally but relatively low wage 'eating out of a big rice pot' (*daguofan*) (Leung, 1994). As Warner (1997: 577) noted:

> We see strong egalitarianism: minimal reward differentials within categories of worker, largely based on age, length of service and political loyalty;

> minimal differentials *between* categories (factory boss and workers, for example); a rigid eight-grade wage system (sixteen for cadres)……

Some researchers have found that the pay differential between managers at different levels was no more than threefold (Gen, 1998: 43), with the absolute value small, i.e. about several hundreds RMB units.

A series of payment structure reforms, which started in the mid-1980s, have taken place in the past two decades. The aim was to motive employees by gradually moving to a performance based system. Deng Xiao Ping (1984) had previously called for distribution according to the quantity and quality of an individual's work including performance, technical level and actual contribution. The 'floating payment system' (*fudong gongzi zhi*) was then widely adopted in SOEs. This payment system was based on the previous system and started to relate to collective or individual performance. In particular, this system involved total enterprise payroll contracts with the government, linking to the fulfilment of a predetermined enterprise performance indicator such as profit, sales or a measure of output. Management's power over individual payment was limited. The introduction of the 'director (managers) responsibility system' granted enterprise management more power in determining an individual employee's pay. The 'structural payment system' (*jieguo gongzi zhi*), which broke from the planned payment system and established a closer connection between pay and individual performance, was launched in late 1984. It comprised four main elements: basic pay *(jichu gongzi*), post pay *(zhiwu gongzi*), seniority supplements (*gongling jintie*) and bonus (*Jiang*

jin). It should be noted that this payment system reform tried to give all employees, rather than managers in particular, more incentive.

In 1992, the 'post-plus-skill' (*gangji gongzi zhi*) model was adopted. It shifted away from an age and service related pay structure to a job evaluated system. Individual pay was thus adjusted in the light of the individual's performance rating, as measured by core skills for each grade and position within the pay scale. Accordingly, managers with a good performance could get higher pay. In fact, there was some evidence that managers did not apply the new payment system because a large income gap would discourage other employees (Li, 1992: 172). Pay disparity become acute amongst different occupational groups in the 1990s (Mok, 1995).

When the economic reforms progressed, although some SOEs had improved their performance, the majority still faced the problem of low efficiency. It was believed that the crux was that top managers were not given sufficient incentives due to low income as compared with those in non-state-owned enterprises. Here, top manager refers to the managers at the top executive level. It may be general managers in corporatised SOEs or legal representatives in SOEs.

In 1993, the 'annual salary system' (*nian xin zhi*) was introduced in order to motivate top managers. Accordingly, top managers' salaries were separated from employees' salaries and were linked to their responsibility, risk and economic efficiency in one year. Local governments practiced the new payment system in various ways. In 1994, the State Council issued the 'contract administration rules', which made the provision that top managers' incomes must be less than three times

the employees' average salaries. In practice, some top managers' incomes exceeded the limit set by the government. By contrast, some general managers had not applied the 'annual salary system' because they feared it would undermine employee motivation and commitment.

Bonuses are another important component of the Chinese motivation system. Starting in 1979, enterprises were able to generate large bonuses which were linked to their total annual salary bill. In 1985, the norm for an enterprise's annual total of bonus payments was raised to four months of the year's salary bill. Within this restriction on the total allocation to the bonuses, managers could decide the amount of bonuses for their employees according to their performance. For example, production workers received bonuses according to output, quality and timekeeping. Although many Chinese enterprises increased their bonuses dramatically in the late 1980s, the differential between managers and workers and even between managers was not large. Due to poor performance, subsidies and bonuses were taken away from loss making SOEs.

2.3.2 The Polarisation of Managers' Pay

There is a varying payment structure in different companies. The most popular payment structure is the 'post-plus-skill' system although different companies adopt different amounts in respect of post and grade. For example, there are 5 main grades amongst workers in Chem-1 and 8 main grades for workers in Publ-1. However, Text-1 uses 'hidden pay' which means that the wage and bonus of an employee are decided directly and separately from the director and are not known by others.

Another exception is Elec-3, where the length of service is added to the payment structure because there are many old workers who have very long service but relatively low skill, and post and skill are the other two elements. In particular, the payment structure of auto companies is the 'post + performance + seniority (*gang wei + xiao yi + gong lin*)'.

Table 2.9 Average Annual Pay in Selected Shanghai SOEs.

Companies	Employee's average pay	Middle manager's pay	Top manager's pay plus bonus	Employee's average bonus
Auto-1	24,000	36,000	100,000	5,000—12,000
Auto-4	23,000	36,000	80,000	10,000
Elec—1	12,000	18,000	60,000	14,000—20,000
Elec—3	11,000	15,000	100,000	varies
Chem-1	15,000	16,000	80,000	6,000-14,400
Publ-1	12,000	14,000-30,000	100,000	400--3,000
Cons-3	25,000	25,000-80,000	100,000	*
Text-1	10,200	12,000	*	0- 3,000
Tran-1	12,000	12,000-21,600	36,000	0
Tran-2	6,000	10,000	*	0

Note: * missing data.

Table 2.9 shows the difference in overall average salary levels in the ten companies, which is based upon interviews with top managers or middle managers in these companies and does not precisely represent their payment structure. Table 2.9 indicates that top managers were paid RMB 36,000 to RMB 100,000 which is more than 3 times the average wage of employees. The ratio of middle managers' wage to the average wage varies from 1.2: 1 to 3: 1. The pay differentials between industries are strongly associated with the performance of companies. The average

wage of employees in SOEs in Shanghai in 1997 was RMB 11,733 and the proportion of bonus to total wage was 29% (*Shanghai Economy Year Book*, 1998: 304). In addition to their wages, all employees in auto companies have fringe benefits, supplementary old-age pension insurance and a supplementary housing accumulation fund (this will be discussed in Chapter 8).

Several conditions are suggested by the following discussion: (1) Income disparity is apparently enlarged between top managers and other management in the same SOE. Top manager's pay in the companies that carry out the 'annual salary system'(*nina xin zhi*) is higher than those in the companies that do not apply the 'annual salary system'. (2) The income of middle contracted managers is higher than those who have not signed contracts with the companies. (3) A gap is enlarging in SOEs across industrial sectors which show different performance.

2.3.3 The Factors Influencing Differences in Managers' Pay

2.3.3.1 The 'Annual Salary System' and Top Managers' Income

The polarisation of managers' incomes results from the payment system. In order to set up mechanisms of 'interest risk' for top managers, the Shanghai municipal government has, since 1993, encouraged some enterprises to apply the 'annual salary system' (*nina xin zhi*). In 1998, the government suggested that excellent top managers might be rewarded a certain amount of enterprise forward shares, supplementary pension or compensation for taking a risk. The aim is to link the interest of top managers to the fate of enterprises. In my survey sample, 40% of Shanghai companies have applied the 'annual salary system' (*nina xin zhi)* whilst

15.5% of total companies at the national level have done the same. The director of Publ-1 explained:

> Under the 'annual salary system' (*nian xin zhi)*, I signed a contract with the upper administration, which includes targets and duties such as safety, accident rates, employee training, service quality, vehicle maintenance and profits and so on. The upper administration determines my salary level which links up with the company's equity, my responsibility, business risks and work achievement. My salary is comprised of a basic salary which is 3 times as much as an employee's salary, and bonuses vary according to my performance. It will be recalculated after the assessment at the end of year. This payment system encourages me to work hard in order to improve the performance of the company.

His annual salary including bonus was about RMB 100,000 in 1998 whilst the average wages of employees, at that time, was RMB 10,000. It is 10 times the employee's average wage. Of the RMB 100,000, 60% is made up of bonuses. The director of Chem-1 told me that his pay was related to his successful management. He received RMB 40,000 salary and RMB 40,000 bonus in 1998. This top manager's real salary was higher than employees in his firm expected. In some cases, for example, in Elec-3, employees knew that their top manager would get a salary of RMB 100,000 if the company fulfilled the quotas. The 'annual salary system' was applied in both profit-making and loss-making companies. In Tran-2, general manager Chen received an annual salary because he reduced company losses as per his contract. Three out of 24 companies had workers who were in arrears of pay.

In China, some top managers may have a 'grey income' (*hui se shuo ru*), which includes bribes, gifts, bonuses and other fringe benefits such as banquets and weekend trips squandering company monies. Normally, a top manager can freely spend the company's budget at least RMB 100,000 a year.

2.3.3.2 Internal Contractual System and Middle Managers' Pay

The greatest difference amongst middle managers arises from the application of the 'internal contract system'. Some middle managers have been removed from the regular payment system and placed on individual employment contracts in which performance based pay constitutes a substantial proportion of overall remuneration. Managers in workshops are encouraged to work hard to fulfil higher production quotas. In Publ-1, driving team managers, who signed a contract, earned at least RMB 20,000 a year whilst most middle managers received RMB 14,000. A 38 year old female manager got the highest income including wages and bonuses of RMB 40,000 a year. As a rare case, the salary of a project manager in Cons-3 is approximately RMB 80,000 a year when his performance is good. The income of other middle managers and junior managers without contracts with the enterprise is determined by their positions and skills.

2.3.3.3 The Performance of the Company and the Average Wage of Employees

It is evident that manager's pay varies with company economic efficiency or the ability to hit specified targets, which may not be the same thing. Below is supplementary information about the average monthly pay of employees. For

example, in Auto-2, a company with high profits, the average monthly pay of employees is about RMB 1,500 and incorporated bonuses amount to an average of around RMB 1,500. In Ligh-3, a company with average profits, the average monthly pay is approximately RMB 1,250. However, in Tran-4, a company with low profits, the pay is about RMB 800. In Publ-1, pay increases as the company gradually makes profits. Ye was happy about this:

> I was paid RMB 900 a month last year. This year I get RMB 1,400 a month because my company has made profits. That is good. A middle manager with a deputy position gets RMB 1,200 a month and a junior manager has only RMB 900 (a middle manager in Publ-1).

Managers in SOEs with financial difficulties are experiencing reductions in wages and welfare benefits. SOEs with poor economic performance find it difficult to pay their employees the basic salary. The 'off-duty' *(xia gong)* employees in Shanghai--*some of whom are managers*--receive less than RMB 300 subsidy a month (there are other subsidies in individual companies), an amount that is totally inadequate for even basic necessities.

In those companies in which I conducted interviews, the lowest payment that middle managers and junior managers received was RMB 6,500 a year which is about £500. In addition, they did not get their monthly salary on time. They had to be on waiting lists to reimburse their medical costs.

2.3.4 Managers' Perceptions of Their Pay

Managers' perception of their pay is related to the organisation and individual background. In analysing the dimensions of pay evaluation, a comparison is made between different backgrounds and with age and job levels in particular.

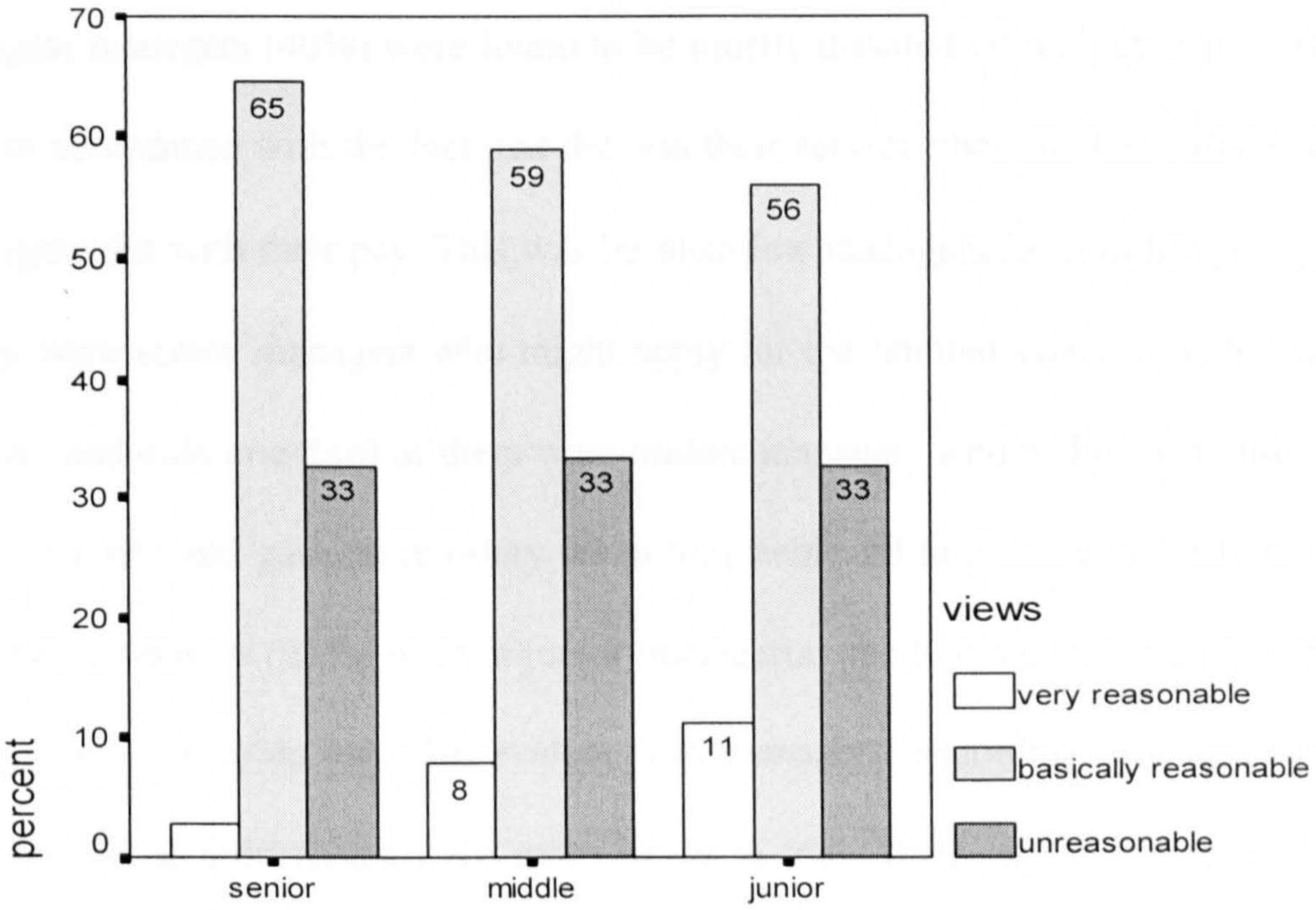
Figure 2.6 indicates that 334 managers accounting for 33% at all levels felt their pay was not reasonable. Judged on this basis, there were no big differences amongst managers in the three job level categories. However, individuals expressed their strong feeling about their pay when they were interviewed. It is evident that senior managers were more satisfied than others. Director Fu of Chem-1 showed his satisfaction:

> In my opinion, the rewards for top managers in state-owned companies are not lower than that in the joint-venture company where I had been. I am happy with my pay. On the other hand, I feel pressure to achieve profit targets. I am not sure if I can get the same amount of profit next year because I have found some hidden problems in production. The middle and junior managers just received basic pay for living. There is not enough money for them to cope with unexpected incidents.

A middle manager in Tran-2, a company that had shown major losses, complained about his lower pay:

> My salary is only RMB 500 per month. What can I do with this little money? Our pay has not been increased for three years. It means that our real wage value has decreased 20 per cent if we consider inflation. I don't worry about my job. I prefer to be laid off and find a new job. I hesitate to stay or leave. It is difficult for me to struggle out of my situation.

Figure 2.6 Managers' Perceptions of Their Pay by Job Level.



Total N= 879

Wang gave his views on the effect of under-payment:

> Generally speaking, middle managers in our firm get lower pay than the others because we are suffering from a loss. So it is understandable why we complain about our poor pay (a middle manager in Text-1).

A junior manager in the same company was resentful of his poor pay:

> I am ashamed because I cannot afford a basic life for my family. My wife and I have not bought new clothes for several years. I cannot afford the RMB 400 tuition fee for my daughter who is studying at a high school. I have to rely on financial support from my parents.

From Table 2.10, it can be seen that women were less likely to rate their salary 'unreasonable' although there was small difference between the genders. The youngest managers (40%) were found to be mostly dissatisfied with their pay. This was in accordance with the fact that the less their service, then the less satisfaction managers felt with their pay. This was because few managers (3%) in the youngest group were senior managers who might apply for the 'annual salary system' (*nina xin zhi)* and only one third of them were middle managers who had opportunities to sign contracts and gain more salary when they achieved targets. A majority of the youngest managers (65%) were in junior managerial position and received low pay. A marked association was also evident with managers' schooling. Managers who had studied at universities were more likely to view their pay as 'unreasonable' (55% of them being in the youngest group).

Table 2.10 Managers' Views on Their Pay by Different Backgrounds.

Unit: %

		Very reasonable	Reasonable	Unreasonable
Gender	Male	8	58	34
(n= 879)	Female	9	62	29
Age	<36	11	49	40
(n= 879)	36--50	8	62	30
	>50	5	65	30
Educational level	Secondary school	9	61	30
(n=872)	College	8	62	30
	University	9	49	42
	Postgraduate school	5	65	30
Length of service	< 10 years	14	44	42
(n=878)	11--20 years	8	56	36
	21--30 years	8	60	32
	>30 years	5	69	26

2.4 Elimination of Job Security

2.4.1 Background to Reform of the Employment System

Before the reform of the employment system, all employees in SOEs benefited from lifetime employment, known as the 'iron-rice bowl' (*tie fan wan*), and concomitant 'cradle to grave' welfare. Employees were allocated work by a local labour bureau and were then permanently attached to the organisation. There were two separate employment systems. Ordinary workers and entry level staff members were in the 'labour management system' and cadres (*gan bu)* were in the 'personnel management system'. The term 'cadre' refers to administrative staff (managers, supervisors, party officials, etc) and professional personnel (technicians, engineers, etc). Cadre enjoyed the benefits of the 'iron chair' which guaranteed tenure in managerial positions. This sort of employment system was associated with problems of over-staffing, lack of motivation and stagnation of productivity.

To resolve these problems, the government carried out an employment system reform from the mid-1980s onwards. In 1986, the State Council implemented a 'labour contract system' (*laodong hetong zhi*) for SOEs, which places new state sector workers on fixed–term contracts, without the job security formerly guaranteed to permanent workers (Philion, 1998: 526). SOE workers were the first to be plagued by unemployment because they would lose their jobs if the contracts were not renewed. By 1992, this procedure was extended in pilot enterprises to all their employees including cadres, it was known as the 'all employee contract system' (*quanyuan hetong zhi*). There was strong competition for managerial positions. This was a signal that managerial jobs could no longer be taken for

granted. Although directors in SOEs gained more powers over hiring and firing employees to improve their competitive capacity, they 'avoided firing a worker in order to preserve harmony in labour relations' (Child, 1994: 163).

The Labour Law was implemented in 1995, which allowed for short term contracts of one to five years and long term contracts of 5 or more years, and fully legitimised redundancies for the first time. 'In recent years, all SOEs, including corporatised ones, have been rigorously shedding surplus labour and cutting welfare benefits' (Lau, 2000: 60). Redundancies took place frequently partly due to the companies' strategy of cutting costs to improve efficiency; partly due to the companies' failure to outstrip competition; and partly due to the government's strategy to restructure industries. Mergers and bankruptcies of SOEs caused massive redundancies.

There are two kinds of redundant employees. One is an 'off duty' (*xia gang*) employee who still keeps their labour relations with their former units and can get subsidies and benefits from them. '*Xia gang* literally means "waiting for a post". It has strict legal restrictions, which avoid actual redundancy in the short run, in order to discourage employers from hiring and firing labour at will. Nevertheless, the reality is that, once a person has been selected for *xia gang* she rarely gets her old job back, and often ends up redundant after a few years (currently set at three years)' (Taylor, 2002: 270). The other is a dismissed employee who no longer has a relationship with their former unit and does not receive fringe benefits from them when their contracts are terminated or when the enterprises are bankrupted. A specific program is the voluntary redundancy programme (in USA, the equivalence

would be a 'buyout'). Dismissed employees who are voluntarily released from their labour contracts, and no longer former unit employees, receive economic compensation which is called severance pay.

In 1997, 303,000 Shanghai workers leaving their working posts entered the reemployment service centres which helped to arrange employment for redundant employees. Amongst them, 205,000 workers were laid off, roughly the same level as in the previous year (*Shanghai Economy Year Book*, 1998: 258). Employees in the textile industry have reduced to 280,000 from 550,000 since 1992. Some 10,000 employees in public service companies were off duties. Some off duty employees were managers. The employment system reform has inevitably impacted upon managers' job security.

2.4.2 How Redundancy Impacts on Managers

Redundancies occurred in the all companies in which I conducted my survey. In the very profitable firm Chem-1, 160 employees were made to take early retirement in 1998. They got a basic wage of about RMB 250 and RMB 500 subsidies monthly from their company. In five automobile companies, early retirement also applied. In Elec-2, 750 employees have been removed. Publ-1 has trimmed 1,200 employees and 3,400 employees lost their jobs due to the bankruptcy of a textile firm. In Cons-3, the labour force declined from 7,000 employees in 1992 to 3,600 by 1998. In Elec-1, over 100 employees were shed. A driving team manager in Publ-1 described the redundancy as 'the Cultural Revolution which affected every family'. It was a

fact that amongst nine senior managers in Elec-2, each family had a member being laid off.

How have managers in SOEs been affected? Managers no longer enjoy the benefits of the 'iron chair' (*tian jiao yi)*, a secure job irrespective of their work performance. Every employee could go up and go down under the policy of 'letting the superior win out through fair competition'. Managers and workers suffered from the same fate during the reforms, as Xu described:

> The 'iron chair' has had a leg cut off. Nobody can sit steadily. He will fall down if his body cannot keep balanced (a middle manager in Cons-3).

The party secretary Wu in the same firm agreed with him:

> The concept of the 'cadre' is no longer important. Everyone belongs to the Human Resource Centre and signs a contract with it. A manager will be removed if his/her performance is poor.

2.4.2.1 Removal from Former Managerial Positions

In some cases, downsizing started with managerial positions. About 20% of managers in Elect-2 were removed from their positions in 1996. Around 40% of managers at Tran-2 were cut, followed by the layoff of workers. 180 managerial officers of Publ-1 left their positions before the workers were laid off. In contrast, Cons-3 firstly removed peasant contractual workers; then the fixed contract workers; and finally the managerial staff. In Tran-3, 107 cadres were shifted after

workers were notified of redundancy. The personnel manager in Publ-1 gave some examples:

> Our restructuring of management started from the senior level. Two out of four vice general managers left firstly. Some middle managers shifted from chief position to deputy position. In a driving team, half the middle managers and junior managers were cut. 180 managerial officials left their positions due to restructuring.

Managers leaving their former positions were normally shifted to lower managerial positions or left managerial positions to be ordinary workers. During the reductions, each manager had to go through a selection process to decide who would stay and who would have to go, as Ye recalled:

> I gained this managerial position, the chief of the Administration office, through strong competition. You see, I and two other people applied for it. They had strong backgrounds with 10 years of experience. The result was that I won and others were moved to the lower positions (a middle manager in Publ-1).

2.4.2.2 Redundancies

Managers had experienced redundancy during the economic restructuring. They went to parts of the service sector (*san chan)*, such as food services, transportation, domestic services, retailing; or they joined technology development business companies; or they hunted jobs in the labour market by themselves. Older redundant managers were normally asked to take early retirement. They received

subsidies from their former units and will get a pension when they reach retirement age. The personnel manager of Publ-1 gave the details:

> According to the rule in our company, female workers retire at 50 and female cadres retire at 55. During our adjustment, two 50-year-old women were shifted from their managerial positions to workers' positions and then retired.

In particular, a large number of managers became redundant when their enterprises declared bankruptcy or were merged. In Shanghai, 27 enterprises were bankrupted, involving 54,704 staff and workers; and 75 enterprises were merged affecting 50,944 employees in 1997 (*Shanghai Economy Year Book*, 1998: 37). In 1996, Text-5 announced bankruptcy due to the company's major losses. Managers were shocked when they heard of this but they had to face reality. Its 3,400 employees including 30 middle managers and 150 other managerial staff left, except for 20 people who stayed to liquidate the company equity. A 35-year-old woman, who was a personnel administration officer, left the company despite the fact that her husband was in a critical physical condition. She was later in great distress. Another women manager, who was once awarded a medal, finally got a service job in a TV station. The former chairman tried to mentor employees and to help them to look for jobs. She reported the employees' situation to municipal leaders and got help for these former employees.

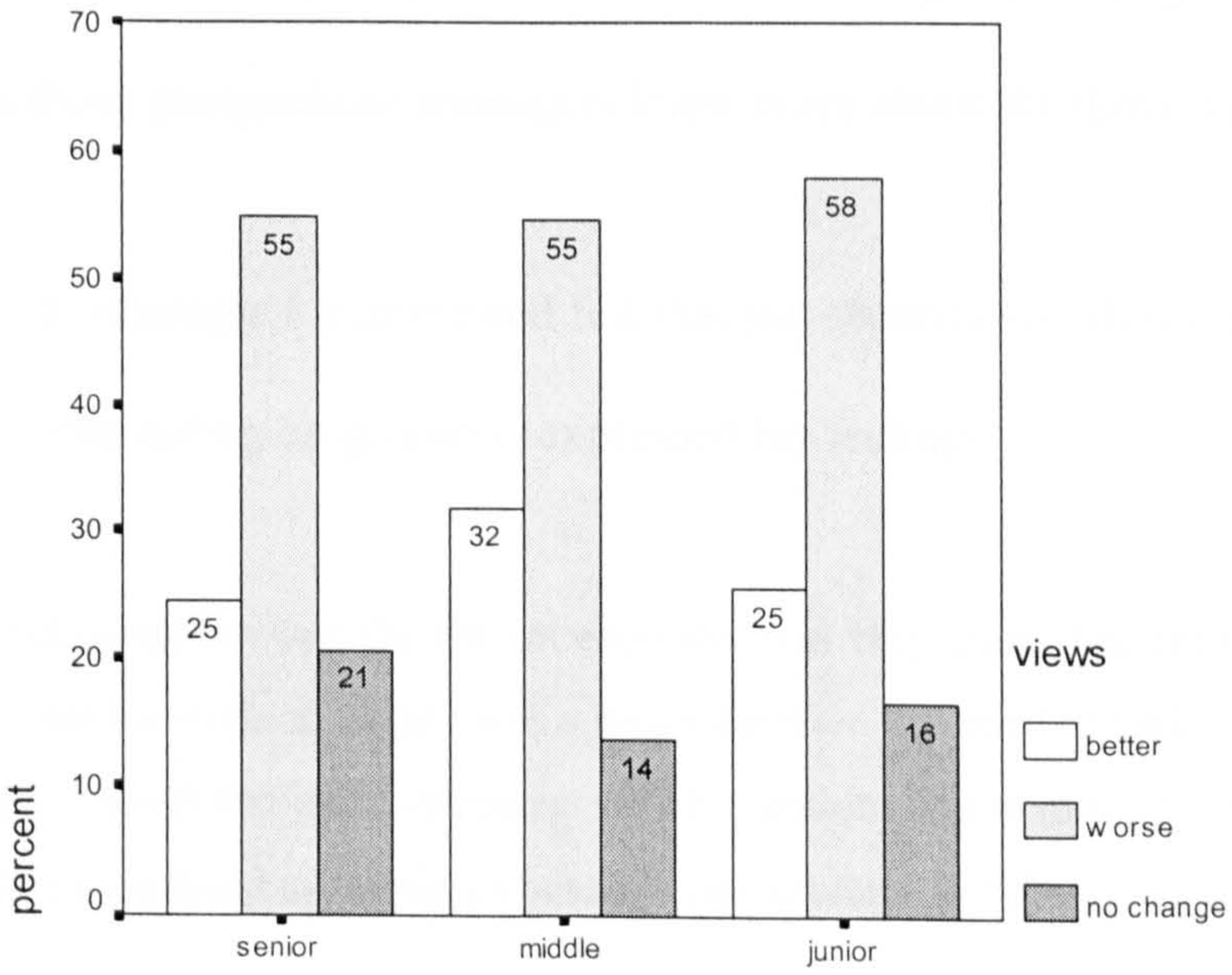
A few managers took voluntary redundancy. They received compensation which varied according to their service length. In Chem-1, the compensation is about RMB 1,000 per service year. For example, a worker having worked for 35 years will obtain RMB 35,000. In Cons-3, some employees who left in 1995

obtained RMB 20,000 compensation. It is complained that the amount of compensation is too small.

2.4.3 Managers' Perceptions of Changes on Job Security

From Figure 2.7, it is evident that over half the managers (56%) claimed that their job security got worse after the reforms. There is a slight difference between managers at different job levels, with 58% of junior managers feeling 'worse'. This might be because junior managers were in the lower levels of the management hierarchy and might be easily moved. Conversely, 32% of middle managers felt their job to be secure, which is higher than the others by 7 percentage points. This may be explained by the fact that middle managers, with more skills and work experience, are less likely to be made redundant.

Figure 2.7 Managers' Perceptions of Changes on Job Security by Job Level.



Total N=731

It seems that women were less likely to feel secure than men (see Table 2.11). Indeed, women felt most vulnerable during the labour saving reforms. There is no great difference between the three age groups. The percentage of middle aged managers who answered 'better' (30%) is slightly more than the others (25% younger, 28% older). This may indicate that all managers at different ages are almost equally feeling uncertain. In line with this, there are small differences between managers who have different lengths of service. The longer the service, then the more the managers felt they have some job security. There is a possible explanation that those managers who had relatively low seniority felt more insecure and those managers who had long service and were approaching the end of their careers were less worried about their jobs than those with longer to work before retirement. It shows that the lower the education level, then the more managers felt their job security to be 'worse'. Those managers who graduated from secondary schools reported that their jobs were more insecure than others. However, the percentage of managers who came from postgraduate schools and believed their job security to be better (18%) was lower than other group managers. This might be because those postgraduate managers knew more about the threat to their jobs.

Each manager I interviewed felt that job security had diminished. Hong, who led the restructuring programme, expressed his feelings:

> Employees felt that the market economy was very cruel. The reform asked us to pay for it. Redundancy was a tough decision I needed to make. I tried to be very logical and make decisions with the bottom line in mind. I tried to spread the pain around as evenly as possible (the director in Publ-1).

Ma, who had experienced the whole process of bankruptcy, talked about the managers' situation:

> Bankruptcy was inevitable in some enterprises. All unemployed people including managers were suffering from a big trauma especially when the social labour market was not well developed. It is hard for them to find jobs (the former chairman in Text-5).

Table 2.11 Managers' Perceptions of Changes on Job Security by Different Backgrounds.

Unit: %

		Better	Worse	No change
Gender	Male	30	54	16
(n= 733)	Female	23	62	15
Age	<36	26	55	19
(n= 733)	36--50	30	57	13
	>50	28	53	19
Educational level	Secondary school	31	58	11
(n=727)	College	25	57	18
	University	33	51	16
	Postgraduate school	18	53	29
Length of service	< 10 years	24	61	15
(n=732)	11--20 years	28	53	19
	21--30 years	28	58	14
	>30 years	31	53	16

A middle manager Ye in Publ-1 commented:

> The word 'redundancy' is easier said than done. Redundancy was a particularly painful and unpleasant experience to managers. It was a challenge for managers to accept this great adjustment. The top managers communicated frequently with employees and ensured the selection process was fair, honest and open.

During the process of restructuring, some managers felt lost and were under great pressure. A middle manager, who had experienced displacement from Publ-1, candidly told his story:

> I am about 60 year old and have worked in Publ-1 for 35 years. In 1996, I was asked to move away from my managerial position to the newly established 'technology development company' and to be responsible for its profit and loss. I had a very hard time admitting this was happening to me. As you know, I graduated from a university and contributed to the company. I refused at the beginning and accepted it later because I had no choice. The market economy had no mercy.

Redundant managers have been forced into long-term unemployment or into poorly paid jobs and suffered a radical decline in their standards of living. Some managers who were made redundant directly expressed their resentment. The former chairman Ma in Text-5 recalled:

> One of the former directors, who lost his job, is angry because of what happened to him. Now he is working as a chief of a neighbouring administration committee with a monthly salary of RMB 420, excluding RMB 200 from our former unit. He complains that his daughter could not get medical cost reimbursed from our enterprise.

There were redundant managers who had struggled to hunt for jobs in the glutted job market. A woman who was a lower level manager in Text-5 told her story:

> My firm was bankrupted in 1996. I obtained a job in a railway company as a conductor half a year later. Unfortunately, I lost that job. Then I attended training courses and was recruited as a manager in a supermarket. I was dismissed again. How difficult it was for me to get a job! No one knew my poor situation. Crying was not useful. I have a managerial post in a

> supermarket now. I still do not know with certainty about my future but I am not scared of frustration.

Redundancy appeared to create a sharpened sense of accountability amongst the managers who remained. The survivors had increased work tasks and flexibility. They were unprepared for the changes that resulted from redundancy. Redundancy had a negative impact on the survivors who worried about their futures. A middle manager Huang in Chem-1 notes:

> Normally, male managers retire at the age of 60 and female managers retire at 55. According to our new company rules, they should retire in advance at 57 and 52, respectively. It was terrible to hear this. I would lose lots of money if I retired earlier. This definitely affects my life.

Top executives have a relatively higher job security than other managers. They may be transferred from one firm to another, but are rarely dismissed because they normally progress to a relatively high administrative grade. Similar to their counterparts in government, they are less likely to worry about their job security.

2.5 Summary

This chapter has investigated managers' backgrounds in Shanghai SOEs. As far as basic characteristics are concerned, it found that around two-fifths of managers come from a family where the father is a manual worker. Most senior managers are found in the middle age groups. Men are more likely to be managers than women. Most managers have studied in colleges. A few of them are postgraduates.

This chapter shows the differences between different cohorts of managers. The Cultural Revolution has had a long term impact on the composition of managers in China today. There is an increased proportion of young managers who have better education, and a decreased proportion of middle aged managers, some of them lost opportunities to study in universities in their 20s during the Cultural Revolution. This is because education level is an important factor which influences career development in today's environment of market competition.

The Cultural Revolution also has implications for the possible career development of managers at different ages. There is an increasing tendency for relatively well-educated young people to enter managerial positions earlier than other age groups. Middle aged managers, some of whom returned to university after the Cultural Revolution, constitute the majority of senior managers. They experienced hardships which the young managers did not experience, so they well understand Chinese society and have high career motivation. Two thirds of old managers are in middle managerial positions. Their career developments were interrupted by the Cultural Revolution and they are now facing difficulties with their promotion prospects.

Generally, this chapter has explored the consequences of economic reforms for Shanghai managers. It has found that the 'director (manager) responsibility system' enhances management authority, provides the foundation for the new management regimes and makes it possible to exercise managerial prerogatives over labour. It also found that managerial prerogatives have not been limited by the emergence of the 'modern enterprise system'.

Economic reforms and employment system reforms have impacted on all employees including managers. It is evident that the payment structure is more likely to link individual and enterprise performance and pay disparity is apparently increased between different companies with different performances, and even between different level managers in the same SOE, government policy had a strong influence on the increased gap in managers' pay. Doubtless, the difference in pay between top managers and workers is becoming larger. It seems likely that this will cause the resentment of workers and conflicts in employment relations.

This chapter shows that the degree of job security has fallen abruptly in all SOEs. Managers, as well as other employees, are affected by redundancy. Most SOEs are experiencing a restructuring of the workforce because they are forced to be more competitive with private companies. A series of reforms in the market economy have impacted on managers' situations. It is undeniable that the situation of Shanghai workers is even worse than that of these managers.

The globalisation of the economy, in combination with China's economic reform, has provided opportunities for management to utilise new management techniques such as lean production. This will be discussed in the later chapters.

Chapter Three

Managers and Global Modern Management Techniques

The diffusion process of management knowledge has long been a sociological issue. The sociology of management knowledge has aimed at an explanation of the processes of diffusion and institutionalisation of management knowledge, from academic constructs to social ideas (Alvarez, 1996: 80). Recently sociology of work has paid great attention to the high number of faddish episodes in the popularisation of management knowledge. The diffusion of management ideas requires the interplay of various social processes: triggering economic and political events; the actions of social actors--producers, carriers, advocates; and audiences; and the consumption of ideas--made possible by their resources (for instance, cultural legitimacy and organisational resources) (Alvarez, 1996: 93).

The globalisation of management towards the end of the twentieth century, together with an accelerating rate of technological change, means new challenges for existing management knowledge (Clegg and Palmer, 1996: 4). Chinese managers have been challenged to learn new techniques in response to new changes taking place in the world. In this chapter, I shall look at the extent to which managers in SOEs have knowledge of global modern management techniques (GMMTs); I also examine the sources of their knowledge and find out how the economic social environment and individual factors have influenced Chinese managers to receive and disseminate management knowledge.

3.1 Managers' Knowledge of Modern Management Techniques

3.1.1 Socio-Economic Conditions and Management Strategies

Table 3.1 summarises management strategies and socio-economic environments in China. It presents the background to the introduction of GMMTs in order to understand the extent to which managers have knowledge of these techniques. Economic reforms, aimed at changing strategies and outcomes in the planned economy, led to the development of new management strategies and the introduction of GMMTs. TQM and ISO9000 have been introduced since the 1980s and HRM and cost reduction techniques have been implemented since the 1990s.

Table 3.1 Socio-Economic Conditions and Management Strategies in China.

	Socio-economic features	Strategy	Outcome
1970s	closed planned economy full employment low wages targets	<u>traditional strategy</u> plan and control poor supplier relations	poor quality high waste low productivity
1980s	reform and openness towards the market-economy	<u>emergent strategy</u> competition in national market investments in machinery training TQM	slow diffusion overall
1990s	development of economy	cost and quality focus ISO9000 down-sizing HRM	simple structural-adjustment some diffusion

The People's Republic of China was established in 1949 and was isolated from the West until 1979. During this period of time, government officials regarded

socialism and capitalism as two opposed systems. They not only had set this firmly in their minds, but had also led the people to accept this. Furthermore, loyalty to the party was the key criterion for a manager, rather than knowledge or skills as seen from a Western viewpoint (Zhuang and Whitehill, 1989: 61-62). The Chinese political system and ideology prevented China from adopting any Western values or practices at that time. Looking at the economic system, China practiced a rigid central-command economy for three decades. The government bureaux made all decisions concerning products, prices and distribution. They 'set production targets for each enterprise, distributed its products, allocated supplies and equipment, assigned personnel, took over profits and covered losses' (Fan, 1998: 204). The proportions of those in work with job security were at high levels, but productivity was very low. In many enterprises, the planned economy resulted in massive waste and poor quality of products and low competitive capacity.

China's economic reforms started in 1979. The aim was to decentralise the system of governance, to introduce market principles, and to open up trade and investment relations with the rest of the world (Child, 1994: 1). In the early days of the economic reforms, when Western technologies were introduced into Chinese enterprises, there was control over the transfer of undesirable foreign ideas and practices. Later, the positive attitudes of Chinese politicians made the introduction of GMMTs into China politically possible. Deng Xiao Ping, who was a leader of China's economic reforms, openly proclaimed that a cat was good as long as it caught the mice (economic development) regardless of whether it was black (capitalism) or white (socialism). He reiterates the idea that socialism means eliminating poverty; Pauperism is not socialism and far from communism; The

superiority of the socialist system lies in its ability to improve the people's material and cultural life. In so saying, Deng Xiao Ping advocated adopting good things from capitalism, including advanced and scientific management ideas and techniques. As the reforms progressed, managers in SOEs began to realise the need to learn about foreign management techniques, as Fan (1998: 208) indicated:

> Like a non-swimmer being suddenly plunged into the 'sea of the market' by the forces of reform, Chinese managers became bewildered and rushed in a desperate search for new management concepts and techniques as their previous knowhow had become increasingly obsolete and inadequate in the new market place. They are very keen to learn management knowhow from the West, and interest in experimenting with new management approaches has greatly increased during the past decade or so.

With the further reform of SOEs, managers in SOEs paid great attention to the reforms of ownership in order to survive. It is argued that the restructuring of ownership is no substitute for good enterprise management and the most important thing is to strengthen enterprise management (Rei, 1997). Rei is a professor in the Management School of Shanghai FuDan University and he intends to introduce a set of books about new management techniques. He indicates that the general level of enterprise management in China is lower compared to developed countries although some excellent SOEs are well managed (Rei, 1997: 2). In analysing the reasons for this, Rei points out (1997: 2) that there has been a lack of research on management theory and little popularisation of modern management knowledge; and managers in SOEs are not familiar with modern management techniques even if they intend to manage in scientific ways. Another official survey which collected

data from 2,585 SOEs suffering losses in 1994 concluded that 82% of these firms were due to poor management (Jin, 1997: 371).

3.1.2 Managers' Knowledge of GMMTs

Evidence was drawn from a survey I carried out in 1999, in which I provided Shanghai managers with a checklist in an effort to establish which modern management techniques they were familiar with. Their responses are shown in Table 3.2.

Table 3.2 Extent of Managers' Familiarity with GMMTs.

Techniques (%)	Very familiar (1)	Some familiarity (2)	A little familiar (3)	Any familiarity (1)(2)(3)	Not at all familiar	Missing
Kaizen	3	7	20	30	27	**43**
LP	6	19	25	50	15	**35**
QCs	6	19	25	50	13	**37**
Team	9	30	27	66	6	**28**
JIT	4	12	23	39	23	**38**
BPR	2	7	26	35	21	**44**
FP	3	12	30	45	15	**40**
TQM	17	42	29	88	2	**10**
HRM	8	27	34	69	6	**25**

Total N=1,012 LP=Lean Production, QCs=Quality Circles, JIT=Just-in-Time, BPR=Business Process Reengineering, FP=Flexible Production, TQM=Total Quality Management, HRM=Human Resource Management.

Before saying anything else, it is necessary to explain the missing responses in Table 3.2, the percentage of which varies from 10% to 44%. Few respondents refused to answer my questionnaires and my interpretation is that these missing

responses might be an indication of a lack of knowledge of these techniques and an unwillingness to declare this. Some evidence supports this assumption. When I collected questionnaires in Cons-1, middle manager Chen who helped me in this survey said: 'most modern management techniques are new to me, so it is not surprising that other managers are not familiar with them either. I am sorry for missing answers in some questionnaires.' In Publ-1, administration official Ye expressed the same view: 'it is difficult for us to answer some questions because we have heard little about these management techniques. That is why some of the managers left empty spaces in some places on the questionnaires'. On the other hand, some managers frankly admitted that they had no knowledge of these new management techniques. A middle manager in Cons-2 expressed his feelings that he was very depressed because he knew so little of modern management techniques. When taking missing responses into account, together with the proportion of managers who answered 'not at all', it is found that the level of manager knowledge was relatively low because only 50% of managers claimed to know five of nine management techniques and less than 30% were familiar with all techniques. Moreover, the proportion of managers who were very familiar with the management techniques was very low, varying from 2% (BPR) to 17% (TQM).

Table 3.2 represents the extent to which managers claimed that they were familiar with GMMTs. By the degree of familiarity, the top three techniques are (1) total quality management (88% for any degree of familiarity) (2) human resource management (69%); (3) team working (66%). The middle three techniques are QCs (50%), lean production (50%) and flexible production (45%). The bottom three techniques are JIT (39%), business process re-engineering (BPR, 35%) and Kaizen

(continuous improvement, 30%). Research conducted amongst Turkish managers in the white-goods industry (Nichols *et al.*, 2002: 71) suggests that over nine out of ten claimed to be familiar with TQM, Quality Circles (QCs) and Team Working; seven out of ten with JIT, Kaizen and Flexible Production; six out of ten with Lean Production and five out of ten with BPR. Both Chinese managers and Turkish managers were more likely to be familiar with TQM, QCs and Team Working whilst they were least likely to be familiar with BPR.

Some differences existed between managers in the two countries in terms of the extent to which they were familiar with these management techniques. Overall, there was a higher proportion of Turkish managers who were familiar with these management techniques. There are two possible explanations. Firstly, the velocity at which new management techniques were imported into Turkey increased considerably in the last few decades (Nichols *et al.*, 2002: 69). Secondly, the Turkish firms were all private and often joint ventures, resulting in strong market competition, which had accelerated the diffusion of GMMTs. By contrast, Chinese managers embarked on a learning process through which the dynamic for improvement was mostly passed down from above rather than diffused by their own actions and those of their employees. Top management did not always recognise the increased competitive pressures on management during the period of globalisation.

Research conducted by the State Council Entrepreneurs Investigation System (1999: 144) found that only 3.2% of top managers in Chinese SOEs were very familiar with management knowledge, this demonstrates that top managers in SOEs had insufficient knowledge to manage effectively and could not achieve good

performances. According to my survey, the proportion of managers who were very familiar with new management techniques was low. This affected the implementation of new management techniques in China.

3.1.3 Factors Affecting the Level of Managers' Knowledge of GMMTs

Having outlined the general picture of managers' knowledge of GMMTs, I shall focus on the factors linked to this. My surveys results will be analysed to find out which factors have affected managers' knowledge of GMMTs.

3.1.3.1 Date of Origin

During my fieldwork in Shanghai in 1999, I saw the book *Lean Thinking* (Womack and Jones, 1996) in an English version, which I had not seen in the UK. The authors of this book were co-authors of the book *The Machine that Changed the World* (1990), in which they claimed how companies could dramatically improve their performance through the Lean Production approach pioneered by Toyota. *Lean Thinking* extended these ideas and claimed to provide a new way of thinking to banish waste and create wealth for the corporation. The book *Lean Thinking* was translated into Chinese and published in 1999. This demonstrates that new management techniques could quickly spread from the West to China. Some Chinese scholars and business groups have tried to introduce Western management knowledge into China and to bridge the gap with Western countries.

It might be thought that the earlier management techniques emerge, the more managers know about them. This is true for the case of BPR. It was known by only a few managers because it was a relatively new term even in the Western countries by the beginning of the 90s. However, in the case of TQM and QCs, this viewpoint is only partly true. TQM originated from USA and was developed in Japan and became popular at the end of the 70s in the West. It spread to China at the beginning of 80s by the advocacy of the government. However, although QCs were introduced into China at almost the same time, they were only known by around 50% of managers.

We may observe some differences between HRM and lean production. Both HRM and lean production were introduced into China in the 1990s, but Chinese managers were more familiar with HRM than with lean production. HRM originated in the United States and began to make headway in the UK in the latter part of the 1980s. HRM was applied by management in Chinese SOEs. For example, the personnel department was displaced by a human resource department in some enterprises. Also there was some research on the relationship between the 'three system reforms' (the lifetime employment system, the wage system and the social insurance system) in SOEs and the application of HRM. My survey suggests that over two thirds of managers claimed that they were familiar with it. On the other hand, lean production was developed by Toyota during the 1950s and refined during the 1970s. The book *The Machine that Changed the World* which described lean production was published in America in 1990 and was translated into Chinese in 1991. At the same time, the Department of Mechanical Industry and The China Association of Enterprises Management called for the application of lean

production under a competitive environment. However, lean production has only been applied by a few enterprises (mostly in the automobile industry) which have made substantial efforts to improve their performance. Chinese managers have not universally recognised the importance of this technique.

There is some evidence that the earlier the management techniques emerge, then the more Chinese managers know about them, but this is by no means a rigid rule. Other factors affecting managers' knowledge of GMMTs will also be considered in the following sections.

3.1.3.2 Type of Industry

My research looks at the different situations of managers in both the manufacturing and non-manufacturing sectors. In the survey sample, 5 out of 8 industries were in the manufacturing sector. There were the automotive, electric, chemical, textile, and light industries. The non-manufacturing industries included public service, construction and transportation. 19 out of the 24 companies were within the manufacturing sectors.

Table 3.3 indicates that manager's knowledge is strongly related to their types of industry. The difference between manufacturing and non-manufacturing is remarkable. In general, managers in the manufacturing sector knew more management techniques than those in the non-manufacturing sector. The difference ranged from 5% (TQM), to 31% (lean production), with an average of 17%. The smallest difference (5%) between managers in two sectors existed in their

knowledge of TQM because all industries were asked by the government to apply this technique in the1980s.

Table 3.3 Any Degree of Familiarity with GMMTs by Managers in the Manufacturing and Non-manufacturing Sector.

Unit: %

Techniques	Manufacturing	Non-manufacturing	Difference
Kaizen	34	11	23
Lean production	55	24	31
QCs	54	34	20
Team working	69	52	17
JIT	44	15	29
BPR	38	24	14
Flexible production	48	31	17
TQM	89	84	5
HRM	71	59	12

Total N= 1,012

Table 3.4 Managers' Knowledge of Lean Production in the Different Sectors.

Unit: %

Manufacturing	Any familiarity	Non-manufacturing	Any familiarity
Auto	98	Construction	31
Chemical	52	Transportation	22
Electric	43	Public services	20
Textile	38		
Light Industry	34		

Total N=1,012

The biggest gap is found in the case of lean production (Table 3.4). The proportion of managers in the manufacturing sector who were familiar with it ranged from 98% (automobile industry) to 34% (light industry) whilst the proportion of managers in the non-manufacturing sector, who were familiar with it,

ranged from 31% (construction) to 20% (public services). One of the reasons for this difference was that lean production was typically related to the supply of materials and demand for finished goods in the manufacturing sector, and the non-manufacturing sector did not have material flows and assembly operations.

It is certain that to some extent the nature of an industry determines the necessity for learning about GMMTs. However, comparing manufacturing to non-manufacturing, two common points can be seen from the Table 3.3. Firstly, in both the manufacturing and non-manufacturing sectors, TQM, HRM and team working were ranked in the top three of managers' knowledge of GMMTs. Secondly, even in the manufacturing sector, including the automotive industry which had practiced lean production, less than 52% of managers knew about it. This might be affected by other factors which I shall discuss below.

3.1.3.3 Organisational Performance

A general level of knowledge of GMMTs by managers in a company was clearly related to the company's economic performance. It appeared that managers in the profitable companies were more likely to have knowledge of GMMTs, whilst managers in the companies that had financial problems were less likely to have knowledge of GMMTs. In the case of lean production knowledge, see Table 3.4, managers in the auto industry and chemical industry that had high profits knew more about lean production than those managers in the textile industry, transportation and public services that had poor performance. At least two considerations are relevant here. Firstly, the companies that performed well might

benefit from the implementation of new management techniques and would encourage managers to learn more. Secondly, such profitable companies were able to provide financial support for training or investment because implementing a new management technique was very costly. The situation of some organisations that had poor economic performances was quite different. In their environment, managers gave priority to the sale of goods and making profits. They feared failure in implementing new techniques which could make their situation even worse, as a young senior manager explained:

> My company is facing particularly acute difficulties. The most urgent thing for me is to sell products and to pay the wage bill of employees. I have not sorted these out so it is impossible for me to learn about lean production.

This manager said his priority was to sell products and he did not think that lean production could be used to improve performance. This also happened in other companies, as Jiang admitted:

> To be honest, we have been struggling to cope with economic survival and to keep employees calm. We have thought little about learning Western management techniques despite the fact that it would broaden my vision if I did (the party secretary in Publ-1).

Li, the head of the administration office in Cons-3 commented:

> Compared with developed countries, we fall behind too much in enterprise management. It is a pity that most managers have not understood that they need to learn modern management knowledge in order to survive.

3.1.3.4 Job Levels

Form Table 3.5, it is seen that the proportion of junior managers who knew about the listed management techniques was always lower when compared to the other two groups. In six of the nine cases, senior managers had more management knowledge than the other two groups. By contrast, the percentages (34%, 52%, 41%) of middle managers who knew about Kaizen, lean production and JIT were only a little higher than the percentages (31%, 49%, 37%) of senior managers who knew about them. One reason was that lean production was extensively applied in the auto industry, with 19% of middle managers in total and 3% of senior managers in total in the sample being in this industry.

Table 3.5 Familiarity of Managers at Different Levels with GMMTs.

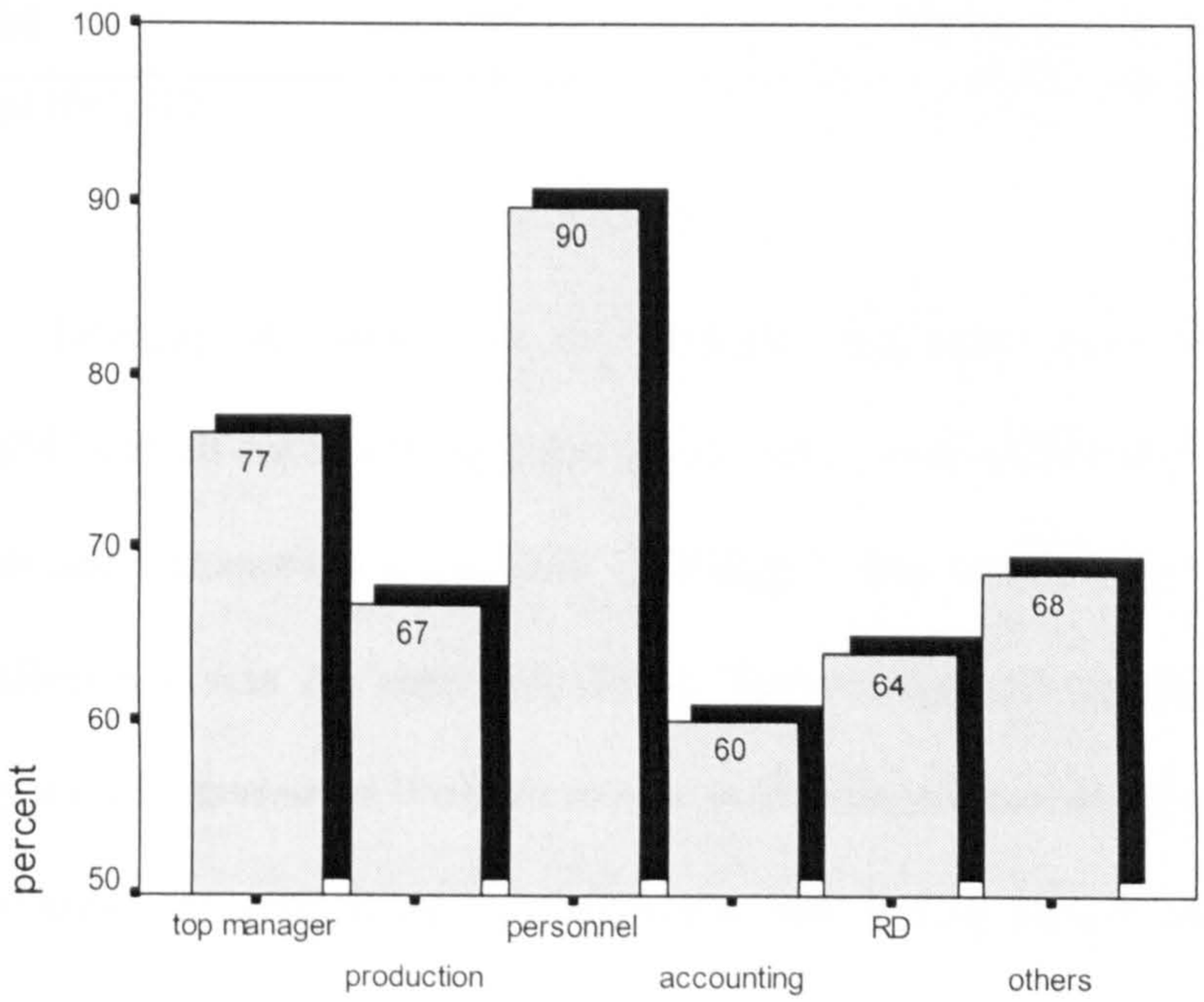
	Senior (%)	Middle (%)	Junior (%)
Kaizen	31	34	23
Lean production	49	52	42
QCs	60	50	47
Team working	74	67	63
JIT	37	41	36
BPR	41	39	29
Flexible production	50	46	41
TQM	92	90	83
HRM	76	72	64

Total N=1,012

Types of job are linked to knowledge of management techniques. Top managers had responsibility for investment, production systems, organisational development and management practices and the like. As a result, senior managers

might have such knowledge for many reasons. Managers in the production department were more familiar with management techniques about production processes and quality management than others. Regarding Flexible Production, my survey suggests that, amongst managers who claimed familiarity, the proportion of managers in the production departments (49%) was higher than that of managers in the research departments (15%) and those who worked in the personnel departments (10%). Similarly, 90% of managers in personnel departments claimed that they knew about HRM, whilst only about 60% of managers in accounting departments claimed to have heard of it (Figure 3.1). This might be explained by the fact that the aim of new management techniques was directly targeted at improving work performance. Managers might attend training courses offered by the organisation or learnt about GMMTs by virtue of their individual initiative.

Figure 3.1 Managers' Knowledge of HRM by Function.



Total N=673

3.1.3.5 Individual Characteristics

There is some significant evidence that the individual characteristics of managers are strongly associated with managers' levels of familiarity with modern management techniques. I investigated these factors such as managers' ages, educational levels and the disciplines they studied at university.

Table 3.6 Distribution of Managers' Familiarity with GMMTs by Age Group.

Techniques (%)	35 and below	36 to 50	51 and above
Kaizen	34	28	26
Lean production	59	45	47
QCs	58	46	50
Team working	80	62	56
JIT	59	34	33
BPR	40	34	31
Flexible production	50	44	37
TQM	88	88	86
HRM	73	69	64

Total N=1,012

Looking at Table 3.6, the youngest managers were most familiar with GMMTs in all cases although there was only a small differential between them and other age managers in some cases. The biggest gap was 26% in terms of JIT and the smallest one was 2% related to TQM. The younger the managers were, the more they were in favour of Western values and assimilated new knowledge, and the less they were constrained by old traditions. Also young people had more chances to learn about GMMTs because some companies saw young managers to be trainable

and to have a potentially inexhaustible enthusiasm for learning. The middle manager Xu in Cons-3 indicated a recent phenomenon:

> Apart from the youngest managers, most of them had more or less experience of the Cultural Revolution when they did not go to university in their 20s. Although some of them got qualifications with part time study, they could not be compared with those young managers who graduated from formal universities. By the way, some middle aged and old managers were promoted from workers. They have had little chance to get training in house.

Some middle-aged and old managers have made efforts to learn GMMTs in order to improve their company's operational performance. In Elet-2, manager Chen, who was in his 40s, learnt nine listed modern management techniques by himself.

Table 3.7 Distribution of Managers Who Are Familiar with GMMTs by Schooling.

Techniques (%)	Secondary school	College	University	Postgraduate school
Kaizen	26	27	36	30
LP	45	47	58	65
QCs	46	49	56	80
Team	59	67	73	90
JIT	35	35	49	50
BPR	30	34	42	65
FP	43	44	48	70
TQM	83	89	88	100
HRM	63	71	74	85

Total N=1,012 LP=Lean Production, FP=Flexible Production

As highlighted in Table 3.7, the educational level of managers is identified as an important factor which influences the managers' knowledge of GMMTs.

Normally postgraduate managers knew more about GMMTs than managers with only graduate status. In terms of BPR, postgraduate managers (65%) were over twice as likely to claim to be familiar with it as those managers (30%) who only attended secondary school. However, it is a fact that even postgraduate managers have had little knowledge of some new management knowledge. For example, seven out of ten postgraduate managers did not know about Kaizen and one third had not learnt about lean production, JIT and BPR. Others managers were yet less well informed.

3.2 Sources of Knowledge about GMMTs

3.2.1 Survey Results

Table 3.8 summarises in detail the sources of managers' knowledge of nine modern management techniques. It reveals the following facts: current company practice or company training were likely to be the main source of knowledge of TQM (96%), Team work (69%) and HRM (63%), these were the leading techniques and were most likely to be known by Shanghai managers. Overall, company practice constituted the most popular source of knowledge of seven out of nine listed techniques. In contrast, the mass media or books constituted the main source of knowledge of BPR and Flexible Production. On average, university education and 'others' methods were less likely to be the source of knowledge of GMMTs. For example, very few managers knew about Kaizen from universities (2%).

Table 3.8 Source of Knowledge about GMMTs for those Shanghai Managers who Claim Familiarity.

Techniques (Row %)*	Company practice	Training	Mass media	Education	Books	Others
Kaizen (n=492)	16	10	8	2	14	3
LP (n=614)	35	24	11	5	22	3
QCs (n=579)	33	24	12	6	23	3
Team (n=670)	46	23	17	8	24	5
JIT (n=593)	29	11	9	3	17	2
BPR (n=515)	11	12	21	5	19	4
FP (n=537)	18	2	22	8	24	4
TQM (n=848)	49	47	11	8	26	2
HRM (n=719)	35	29	19	9	21	4

* The sum of row percentages is not 100% since some managers cited more than one source of knowledge. LP=Lean Production, FP=Flexible Production

Table 3.9 Source of Knowledge about GMMTs for Those Turkish Managers who Claim Familiarity.

Techniques (Row %)	Company practice	Training	Mass media	Education	Books	Others
Kaizen (n=133)	38	26	2	6	21	7
LP (n=106)	37	18	3	10	22	10
QCs (n=192)	56	26	3	4	9	3
Team (n=212)	56	22	4	7	10	11
JIT (n=154)	44	23	4	10	15	0
BPR (n=90)	24	12	11	14	32	6
FP (n=131)	50	12	7	11	15	5
TQM (n=244)	44	31	5	5	12	2

LP=Lean Production, FP=Flexible Production

My research appears to have similar results with the findings of earlier research which was conducted in the white-goods industry in Turkey (Nichols *et al.*, 2002: 71). Table 3.9 indicates that current company practice or company training constituted the main source of knowledge of methods TQM, QCs and Teams in seven or eight out of ten cases. By contrast, in the case of BPR, the mass media or books constituted the main source of knowledge in four out of ten cases. This suggests the less these management techniques are known, the greater the reliance on books and media as sources of knowledge. It is common in both China and Turkey that some managers knew about BPR mainly from books and the media. Most knew about TQM and Team work and these techniques were introduced in these countries in the 1980s and the first part of the 1990s.

3.2.2 Further Analysis of Results

Having given the sources of knowledge about modern management techniques for managers, I shall identify different features of these sources of knowledge and explain how economic and social factors affected managers learning about these techniques.

3.2.2.1 Company Practice

It is suggested that company practice is the most important source for managers to obtain management knowledge. The dynamics of the practice came from two different levels, namely, government strategy and the company strategy.

The government strategy of modernisation resulted in the rapid diffusion of Western management techniques. In February 1979, the *People's Daily*, the most reliable source of official views, called for urgent learning from the West:

> Japan realised industrial and agricultural modernisation in less than twenty years...They [Japanese] realised that technological modernisation went hand in hand with management modernisation. We must pay special attention to this experience. We must systematically study the advanced managerial style of capitalist countries and make it serve our purpose of realising the four modernisations (1979, cited in Lewis and Sun, 1994: 70).

In 1982, the government (the State Economy Committee) campaigned nationally to popularise modern enterprise management technologies. In 1984, it put forward a proposal of applying 18 managerial techniques, such as TQM, total plan management, total cost accounting, total preventive maintenance, system engineering, value engineering, optimisation, activity based costing (ABC management) and statistical control techniques. Modern management techniques were firstly systematically introduced to Chinese SOEs at that time. The government arranged the schedule to push the learning movement forward and assessed the applications of these techniques every year. Learning foreign management knowledge became a widespread phenomenon in Chinese SOEs. For instance, top managers in Chem-1 implemented TQM company-wide. Managers worked out managerial plans after checking all production standards, targets, measures, inspection, records, accounts, regulation. They rebuilt 13 systems of quality guarantees and workers were encouraged to be involved in problem-solving innovation. In most Chinese firms, the main TQM activity was conformance to performance standards and to obtain ISO 9001 or ISO 9002 certification. This

shows that management tended to be oriented to the 'hard'[1] rather than 'soft' form of TQM.

My survey confirms the positive role of the government. For example, all companies in my sample applied TQM and 88% of managers knew about it. When I asked managers which modern management techniques had been applied, most of them mentioned TQM. Professor Rei, the director of the enterprises management department at a university in Shanghai, gave his comments:

> The government's advocacy was of significance. No matter how efficient it was, it did make managers in SOEs recognise that our country was far behind the world, and that global modern management techniques were important to the performance of our enterprises (Rei, 1999).

In 1992, Deng Xiao Ping's southern tour invoked a new impetus to practice GMMTs in SOEs. The government introduced some management techniques but no longer forcefully propelled their application at the national level because previous activity of the government was criticised as a 'precipitate action' and was not efficient. As a result, the government did not advocate lean production nation-wide.

The viewpoints of managers about government advocacy are contradictory. Jiang, a female director of the general office in Chem-1, told me that the application of TQM was pressed by the government and the effects were less than good.

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[1] According to Wilkinson (1997: 801), 'hard' TQM concentrates on the tools and techniques and the systematic measurement and control of the work process. 'Soft' TQM places more importance on areas such as increasing the customer orientation of the organisation, training, employee participation and cultural change.

However, a middle production manager in Auto-5 pointed out that an official call would be a good way to apply lean production:

> In my opinion, SOEs should adopt lean production because it has a special emphasis on flexibility, low inventories, and quick response to market demand. Lean production is useful to reduce waste, to lower costs and to make profits. If the government takes lean production as a way to reform SOEs and advocates adopting this technique nationwide, more and more companies will practice it.

The management strategy in individual companies also affected the implementation of new management techniques. The different strategies of companies reflect different operational and organisational characteristics which include business ideas and goals, competitive priorities, and management mechanisms. In particular, company strategies are related to top management's cognition of market competition and the role of GMMTs. For example, 86% of managers in Elec-3 had heard about HRM from company practice. Similarly, 85% of managers in Elec-4 were familiar with team working because they had introduced it.

My case studies, discussed in detail in later chapters, will indicate that the implementation of lean production in the auto industry is an example of strategic change in management practice and it was inspired by top management. The same thing happened in Chem-1. The survey shows that at least 71% of managers in this firm learnt about lean production due to their director's requirements. This proportion was the second highest overall and was over twice as high as that in

Chem-2 (33%). This resulted from the director's efforts to apply lean production in the firm, as director Fu elaborated:

> One day, by chance, I read *The Machine that Change the World* (1990). I found that this was the best book about management I had ever read. With many years of managerial research and practice, I completely accepted the idea of lean production. If I manage around the idea of lean production in a down-to-earth manner, I believe that a new managerial model, which suits the Chinese case, will be formed. You see, we have stopped the production line for one month to reduce the massive inventories.

Jiang gave her comments on lean production practices:

> We have learnt and used several modern management techniques. Practices varied at the instigation of different directors of our firm in different periods. The new director Fu applied lean production and concentrated on quality management and cost management. He required every operative to follow standards. I think that it is more rational because it aims at resolving current problems and achieving management efficiency.

It is shown clearly that company practice is the best way for managers to learn about modern management techniques. However, there was a lack of such practice of management techniques. These shortcomings might be explained by the fact that there would be lack of high quality top managers, and an inadequate level of the understanding of requirements in industrial competition.

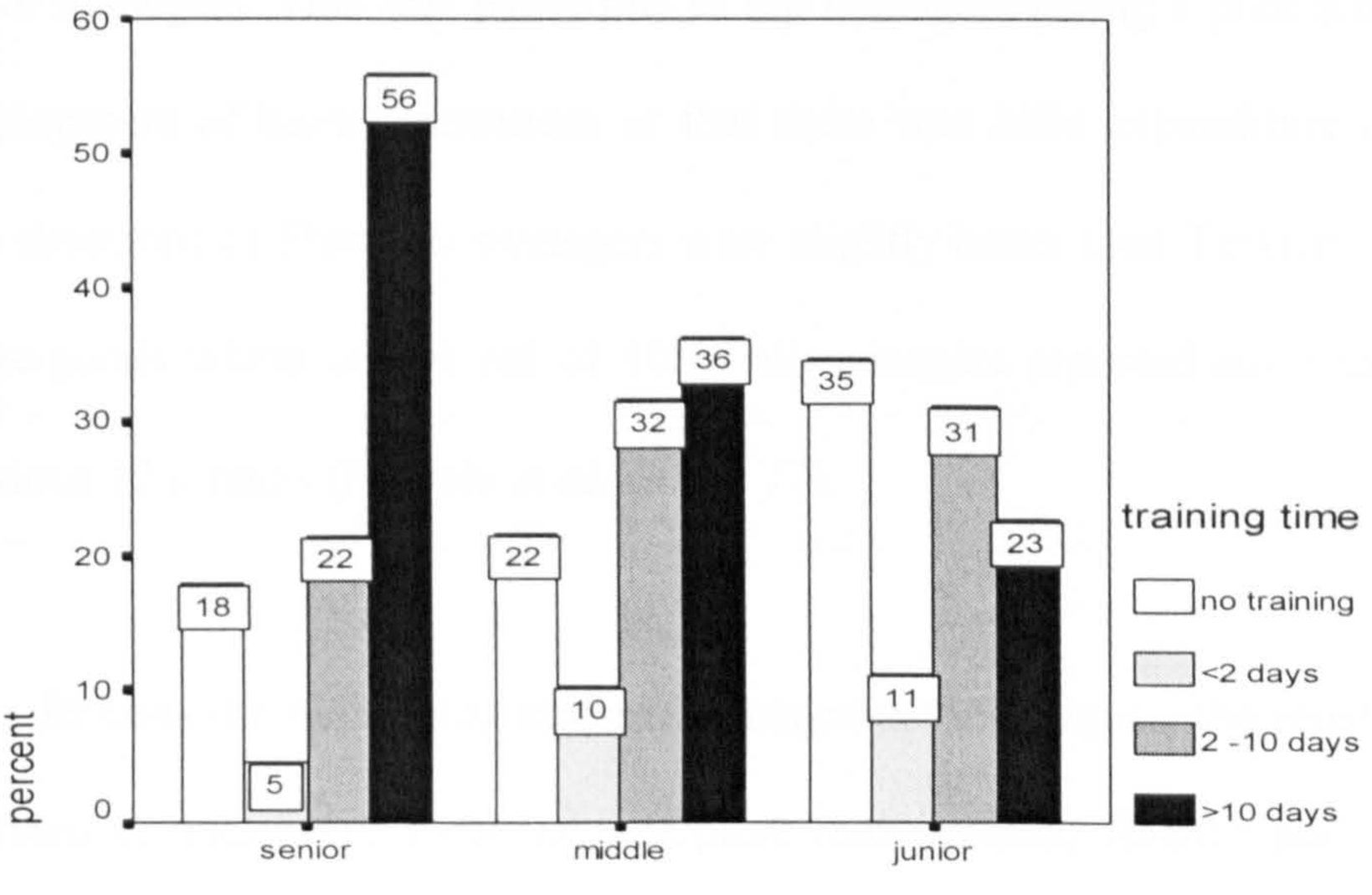
3.2.2.2 Training

From Table 3.8 (source of knowledge about GMMTs), we can see that company practice had a high relevance to training because a company had to train their managers to be familiar with the new rules of new management techniques. Few managers claimed that they studied these techniques from a training course if their company did not practice them.

Managerial training in China became more responsive to the requirements of the economic reforms and the introduction of foreign advanced technology. As Warner observed, a major restraint on technology transfer from the West (and Japan!) was the shortage of professional managers at all levels, especially in market-related disciplines (Warner, 1987). It is not surprising that the reformers have called for the training and building up of managerial and technical cadres to lead the modernisation process (Child, 1994: 172). In March 1979, the China Enterprise Management Association (CEMA) was set up by the State Economic Commission to co-ordinate management education in China. It established a network of training activities involving universities and institutes and SOEs. In 1981, the government decided that middle and senior managers should be trained at least on one enterprise management course. A number of managerial training centres were created by authorities, companies and universities. Foreign experts were invited to give lectures. For example, the Commercial Cadre Institute of Beijing invited an expert from the UK to teach QCs in 1985 (Bank, 1987: 99).

Despite the above efforts, some researchers believe that the majority of Chinese managers lack marketing knowledge and experience of operating in a really competitive marketplace (Chen, 1993). Companies were in danger of losing out to foreign competitors in many markets because their managers were not adequately trained and developed in the appropriate skills and techniques necessary to meet the challenges posed by a rapidly changing organisational landscape. The situation became even worse because there was an acute shortage of qualified marketing educators and inadequate training programmes (Zhou, 1991; Siu, 1994). It will be an arduous task to re-educate and retrain Chinese managers as they have to learn basic skills.

Figure 3.2 Duration of Managerial Training by Job Level.



Total N=941

All companies I investigated have carried out managerial training. Figure 3.2 provides the time spent on training by managers in the three levels between August

1998 and July 1999. It is clear that the higher level the managers were, the longer they attended managerial training. When I looked at managers receiving training of at least 10 days per year, the proportion of senior managers (56%) was much higher than others. In contrast, the proportion of senior managers (5%) who had managerial training for less than 2 days was lower than others. One reason for this may be that the qualification certificate obtained from training was a prerequisite for obtaining directorial or general managerial positions. Moreover, senior managers were more likely to have opportunities to attend training which was organised by the holding companies.

It was reported that amongst senior managers 18% had not received any training in the previous year, this compared to 22% of middle managers and 35% of junior managers. This was partly due to top managers taking a poor attitude to the development of human resources or that there was little expenditure on training. The situations of Shanghai managers were slightly better than Turkish managers in white-goods where only 4 out of 10 of all managers reported any training in the previous 12 months (Nichols *et al.*, 2002: 77).

Besides the nine listed modern management techniques, the most commonly attended courses were those in enterprise management, finance and accounting, organisational behaviour and quality management. The other courses were computer science, health and safety, trading, marketing and so forth. 'Deng Xiao Ping on building socialism with Chinese characteristics' was conducted as a training course.

According to Table 3.10, the industrial sector was a major site for training because on average 53% of managers were trained there (66% top managers, 59% middle managers and 42% lower managers). The individual company was the next most important training site, with 40% of managers being trained within their companies. Each company had its own training features. As an example, Elec-2 had offered MBA courses for senior and middle managers since 1997. Managers were trained in accounting, enterprise strategy, HRM and marketing, and they could obtain certifications after they passed all of their examinations.

Table 3.10 Training Places.

	Company	Sector	Abroad	Other
Percentage*	40	53	5	12

* Row percentages need not total 100%, since there is more than one channel for training.

It was of significance that some managers were trained abroad although it was a very small percentage (5%). When this did occur, managers could systematically acquire new knowledge and look at the operation of GMMTs in foreign companies. For example, director Fu in Chem-1 had been trained at the University of Warwick for three months in 1999. After returning, Fu introduced lean production into his firm. He firstly distributed copies of *The Machine that Changed the World* to senior and middle managers and asked them to take an examination two months later. Fu tried to build up a production flow, and to supply factory's customers on time. In another case, 18 middle managers in Auto-1 were trained in Germany for three weeks from where they imported equipment. The managers subsequently played an important role in implementing lean production.

My survey suggests that very few enterprises have drawn up systematic training programmes for managers. The head of the general office in Publ-1 Ye made the following comments:

> We lack an objective in, and systematisation of, training. Managerial training in Shanghai SOEs was insufficient to diffuse GMMTs techniques very widely. I am told that there is a definite objective of training in some joint ventures and foreign funded companies.

3.2.2.3 Mass Media and Books

There has been an enormous global growth of books on management. By 1989, the number of such books published each year was estimated to have increased by 50 per cent since 1980 (Wood, 1989: 379). It peaked in the 1990s. For example, *The Machine that Changed the World* (Womack, Jones and Roos, 1990) has achieved a singular prominence, selling more than 150,000 copies in the US in its first two years, and becoming a national bestseller. That same year, this book was a best selling business book in Germany (Babson, 1995: 1). The book was translated into 11 languages and sold 400,000 copies globally. As another example, *Reengineering the Corporation* (Hammer and Champy, 1993) was on the best-seller list of *New York Times* for several months in 1993, and GMMTs evoked enormous interest from academics in various disciplines. The constellation of new management techniques have been widely publicised in the business press and journals.

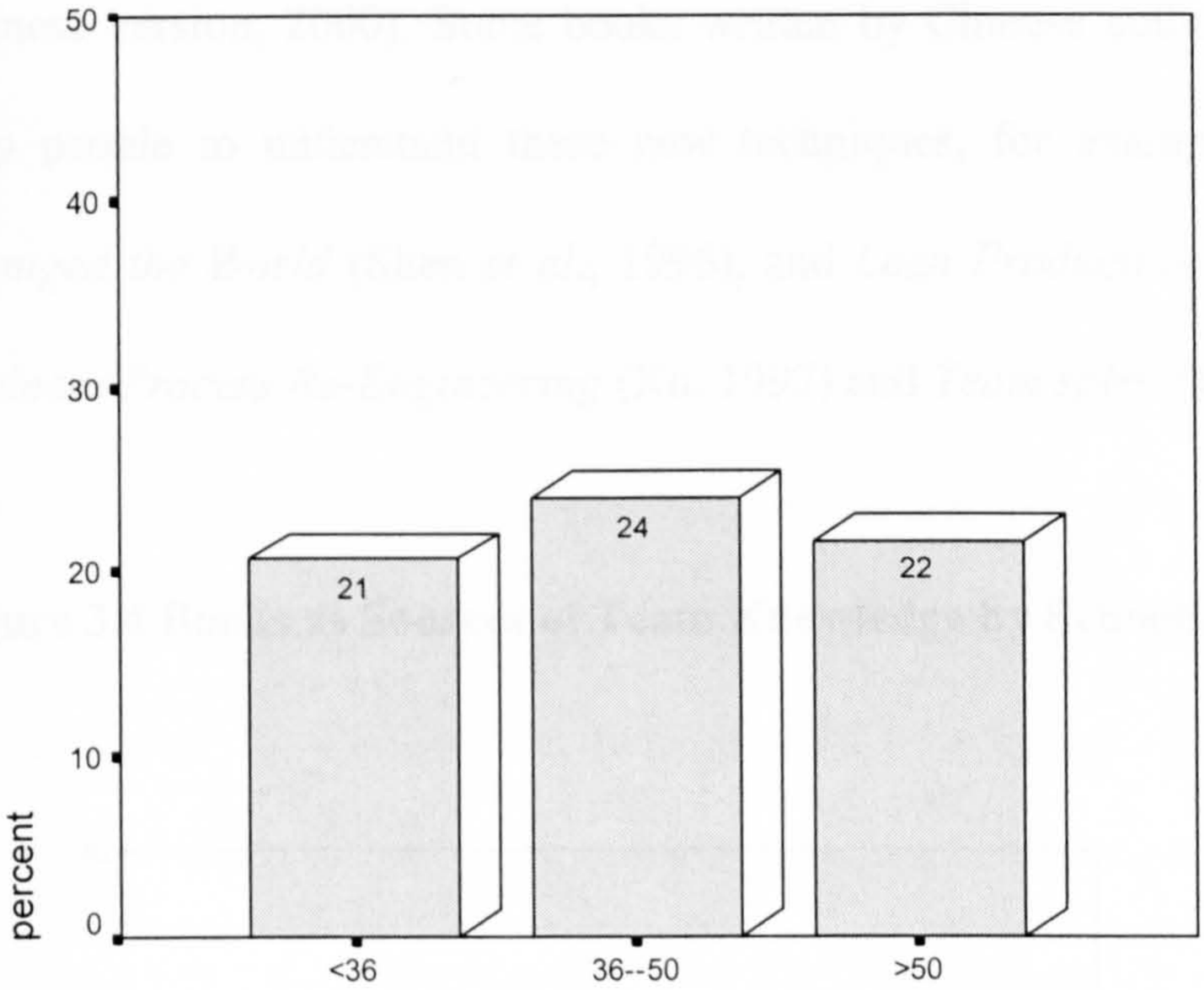
The mass media in China in the reform years became an important channel for spreading information on modern management techniques. Economic and

business coverage in the media attained great importance, and business publications were very popular. After the launching of the economic reforms in 1978, a new kind of journal, *Management World*, emerged to introduce new ideas promoting modernisation, which was run by the Economic, Technological, and Social Development Centre of the State Council (Lewis and Sun, 1994: 66). Some journals and magazines were published at provincial level but had a national circulation such as *Shanghai Management Science.*

During my research, various articles were found in journals which introduced the concepts and theories of global management techniques, made comparisons and shared the experiences of implementation and practical application. For instance, there were articles entitled *Just in Time--a New Innovation of Modern Enterprise Management* (Qian), *The Relationship between Business Process Re-engineering and TQM* (Li, 1998), *Lean Production and Quality of Employees* (Luo), *The Application of Lean Production in Small Enterprises* (Le). However, the articles introducing GMMTs were too few to play an important role in diffusing these techniques.

Figure 3.3 shows that the extent of managers obtaining knowledge from the mass media varied in the different age groups but the differences were small. For example, in the case of learning about flexible production from the mass media, there were a slightly higher proportion of managers in the middle aged group (24%) compared with the younger managers (21%) and the older managers (22%). Similar results were found in the other eight GMMTs.

Figure 3.3 Learning about Flexible Production from Mass Media by Age Group.

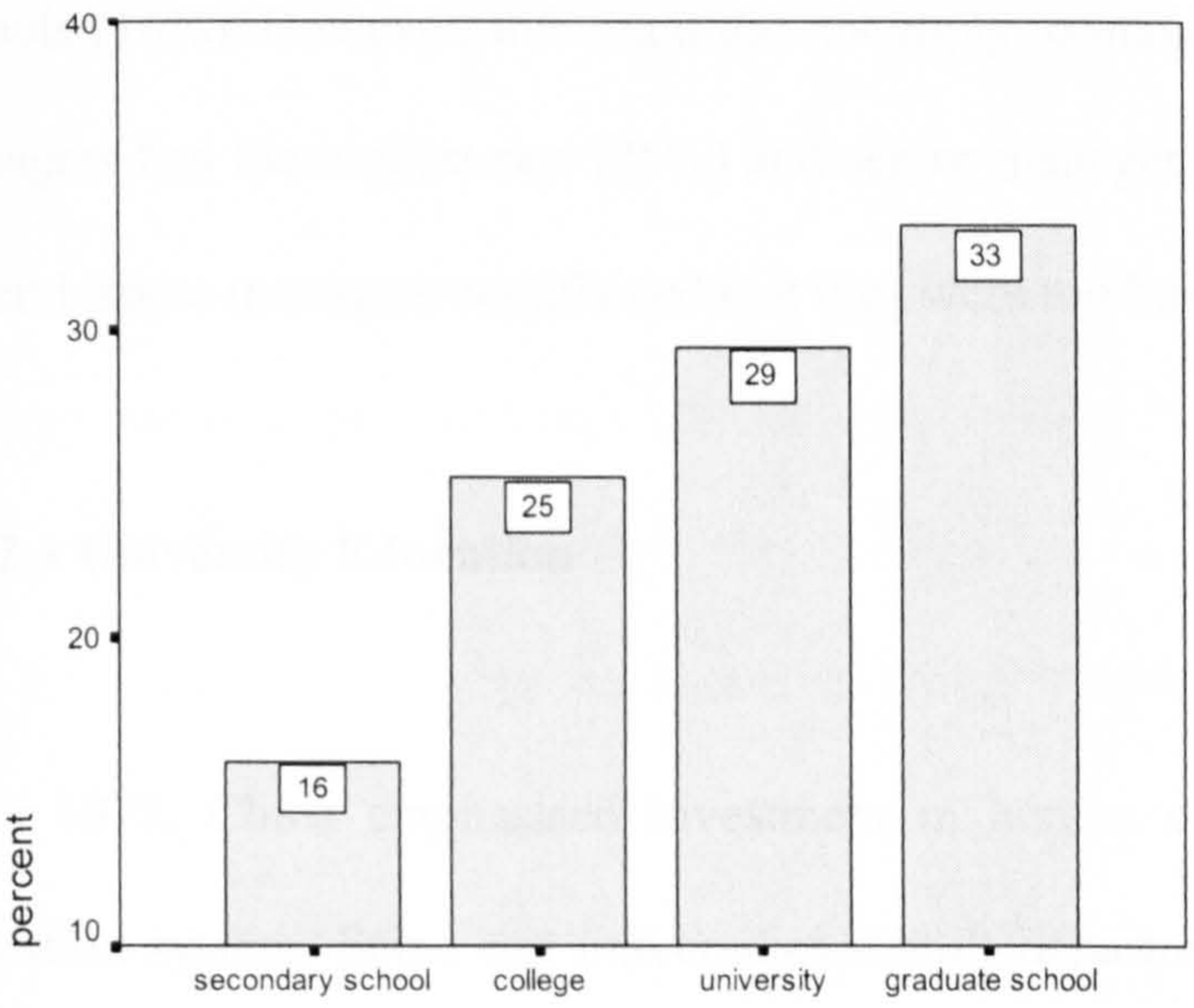


Total N= 120

Books have been an important means of transferring new idea from foreign countries to China. Some English books, which introduce modern management theories and techniques, have been imported and translated into Chinese. In the 1980s, there was an emphasis on organisational behaviour and HRM. One of the representative books, Drucker's *The Practice of Management* (1954), was published in China in 1989. In the 1990s, the emphasis shifted to lean production, JIT, team work, Kaizen and BPR. Various books were translated including *The Machine that Changed the World* (Womack *et al.,* 1990; Chinese version, 1991), *Just in Time the Human Side* (Adair and Heeley, 1991; Chinese version, 1995), *The Lean Enterprise* (Dimancescu *et al.*, 1997; Chinese version, 1998), *Lean Thinking* (Womack and Dania, 1996; Chinese version, 1999), *The Essence of Business*

Process Re-Engineering (Peppard and Rowland, 1995; Chinese version, 1999) and *Gemba Kaizen: A Commonsense, Low-cost Approach to management* (Imai, 1997; Chinese version, 2000). Some books written by Chinese authors then appeared to help people to understand these new techniques, for example, *Production that Changed the World* (Shen *et al.*, 1996), and *Lean Production* (Feng *et al.*, 1995), *Business Process Re-Engineering* (Xu, 1997) and *Team spirit* (Jia *et al.*, 1999).

Figure 3.4 Books as Sources of Team Knowledge by Schooling.



Total N=161

Books are a good source by which managers can learn about new management techniques for themselves. Whether or not a book can be used in this way depends on two factors. One is managers' awareness which leads managers to find the solutions for their enterprises by looking through books. On the other hand, the educational level of managers has an impact on their understanding of

management books, as is clearly seen in Figure 3.4. This figure illustrates the relationship between the educational level of managers and the rate of their learning team working through reading books. Managers who graduated from postgraduate schools accounted for 33%, university graduates 29%, college graduates 25% and secondary school graduates for only 16%. Generally speaking, the higher the educational level managers had, the more likely they were to read books and to understand essential parts of the books. In terms of team working, managers who graduated from postgraduate schools (33%) and reported books as their main source of knowledge number twice as many as those who only graduated from secondary schools (16%). However, this trend did not apply to managers' job levels. Middle managers had the highest rate (25%) and senior manager the lowest rate (22%). In general, some managers complained that they were too busy to read books.

3.2.2.4 University Education

After 1978, China emphasised investment in human capital by developing the education system. Some top universities rebuilt departments of management and ran management courses. Then there was a boom in business schools and schools of economic management. By 1997, 403 out of 1,056 universities in China taught economic management (Rei, 1997: 252) and Business Schools turned out about 5,000 trained managers during 1980 to 1989. Management became the key to employment and professional careers. Several Western management schools (mainly from the US and the UK) have set up joint teaching arrangements with Chinese universities to introduce Western management disciplines since 1979. Some foreign pedagogical material was imported. Chinese students now receive

MBA education not only from Chinese institutions but also institutions abroad. In Shanghai, prestigious universities cooperate with their European and USA counterparts, the Europe International Business School being an example.

In my survey sample, 71% of managers graduated from higher education institutes, with only 30% having studied a management-related discipline. Amongst these managers who studied a management-related discipline, the youngest group (44%) occupied the biggest proportion, compared with middle age group (40%) and the oldest group (16%). As shown in Table 3.8, the percentage of managers who learnt about GMMTs from universities was very low, varying from 9% (HRM) to 2% (Kaizen). This might be that new techniques were introduced into China or appeared in university curricula after managers studied in the universities. In fact, Western management methods such as lean production, inventory management, supply chain and logistics management appeared on the curricula in 1999, whilst they were commonly seen in the courses of Western universities before this date.

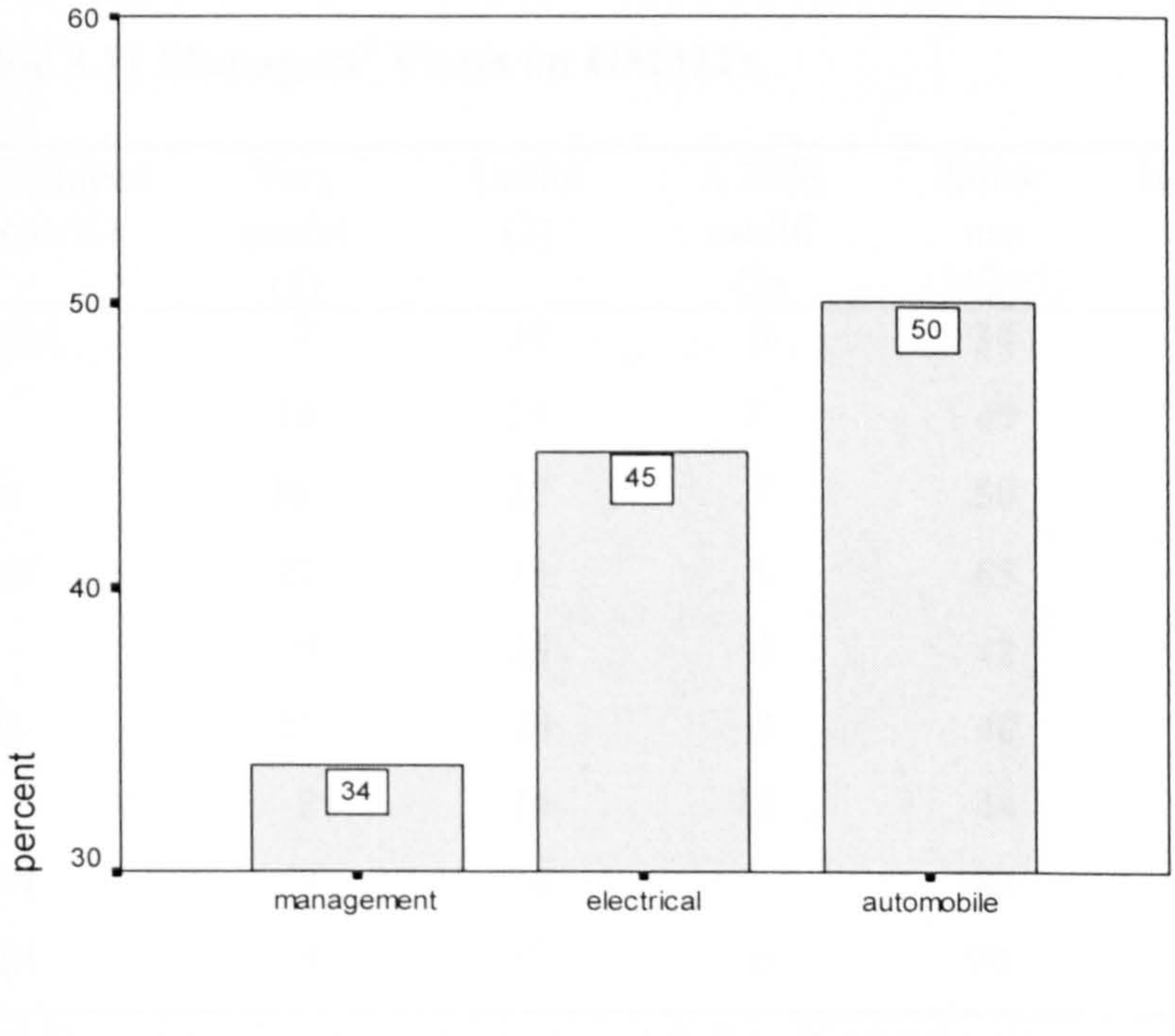
Management education still lacks a thematic unity and intensity, and cannot meet the needs of enterprise production and economic development. The head of the production department in Auto-5 said:

I graduated from a university in Beijing in 1990. I did not learn about production control or flow of materials there. Working in Auto-5, I had not heard of materials flow. Now our company is applying lean production and JIT. The flow of materials as an important part needs to be studied and innovated. Now I am in change of the production flow. From planning, procurement, production, inventory to sells, I have to take pains to learn, understand and apply them by myself. I could freely use this technique now if

I had learnt it in university. I am pleased to know that some universities have courses about flow of materials and inventory management now.

Figure 3.5 shows managers who learnt about automobile engineering or electrical engineering at university and worked in the related industries knew more about Kaizen than those managers who learnt about management at university. It seems likely that more managers learn about Kaizen directly through company practices than through university education. On the other hand, University education enhanced managers' abilities to learn and implement new management techniques.

Figure 3.5 Disciplines and knowledge of Kaizen.



Total N=95

3.3 Managers' Views on Global Modern Management Techniques

3.3.1 Managers' Views on GMMTs in General

Table 3.11 summarises the results of managers' perceptions of nine listed GMMTs. Although many managers did not provide a full response to the survey, nevertheless, some analysis is possible. Firstly, only about half the managers rated nine listed modern management techniques as useful. The average proportion was 53%, with 83% (TQM) being the highest and 34% (Kaizen) the lowest one. The more managers were familiar with these techniques, the more managers thought them useful. For example, TQM was thought the most useful technique and 83% of managers claimed to know about it.

Table 3.11 Managers' Views on GMMTs.

Techniques (Row%)	Very useful (1)	Useful (2)	A little useful (3)	Some use (1+2+3)	Not really useful	No answer
Kaizen	7	18	9	**34**	1	**65**
LP	18	24	7	**49**	1	**50**
QCs	16	27	7	**50**	0	**50**
Team	22	33	8	**63**	0	**37**
JIT	9	25	8	**42**	0	**58**
BPR	11	20	9	**40**	1	**59**
FP	8	24	13	**44**	1	**55**
TQM	40	36	7	**83**	0	**17**
HRM	34	30	6	**70**	0	**30**

Total N=1,012 LP=Lean Production, FP=Flexible Production

Secondly, it is reconfirmed that many missing responses might be because managers had no knowledge of GMMTs. Compared Table 3.11 with Table 3.1

(Managers' familiarity with GMMTs), it is seen that these two missing rates are highly correlated. The missing rates in Table 3.11 are also higher than those in Table 3.1, which might mean that some managers knew about these techniques but had difficulty in giving their assessment because they did not use them extensively. Moreover, managers infrequently answered that these techniques were not really useful.

Managers rating GMMTs as useful did so because they thought GMMTs gave them a competitive advantage inside their organisation, as a personnel manager in Elec-3 said:

> These management techniques--soft techniques are more important than hard versions because they easily form a continuous advantage for enterprise competition. The core ability of these soft techniques is difficult to copy by our opponents and has a long term influence on company performance.

A middle manager in Auto-5 also pointed out:

> GMMTs are advanced techniques because people are regarded as the most important resource in these techniques.

These two managers were aware of the soft form of modern management techniques, such as people management. Trevor (1983) divided management practices into a hard variant (technology, products) and a 'soft' variant (social relations, education, conscience). However, most mangers recognised the advantages of hard variant of these techniques. An information manager in Elec-2

thought that lean production was scientific because it was a system pulled by the market. It was echoed by a production manager in Auto-5:

> Lean production has a special emphasis on flexibility, low inventories, and quick response to market demands. They are based on a wider product mix, multi-skilled operators and fewer organisational levels. BPR is also introduced because the ability to provide quicker responses to customers at lower costs than competitors, as a result of process redesign, can lead to advantages in the market.

By contrast, there was a high proportion of managers who did not rate Kaizen, BPR and JIT. This appears to reflect the fact that managers had inadequate knowledge about these techniques or these techniques did not really work.

3.3.2 Managers' Views on the Adoption of GMMTs

Managers were asked 'what is your view on the adoption of GMMTs'. The survey suggested a high level of support for adoption, with about 85% of managers saying they should be adopted. Managers stressed the importance of adopting GMMTs. This was borne out in their comments. In general, managers thought that modern management techniques were achievements of advanced management and it would be an inexorable trend for Chinese managers to utilise these techniques:

> We will be obsolete and separated from the outside world if we do not catch up with international management levels. Anything which can improve productivity we should learn and adopt (an administration manager in Elec-2).

In particular, modern management techniques were seen to meet the exigencies of the market economy:

> GMMTs are good because they suit a market economy. These techniques focus upon economic efficiency and maximal profit; they give people motivation and call for a high quality of employees; they make management follow strict rules (a middle manager of Auto-4).

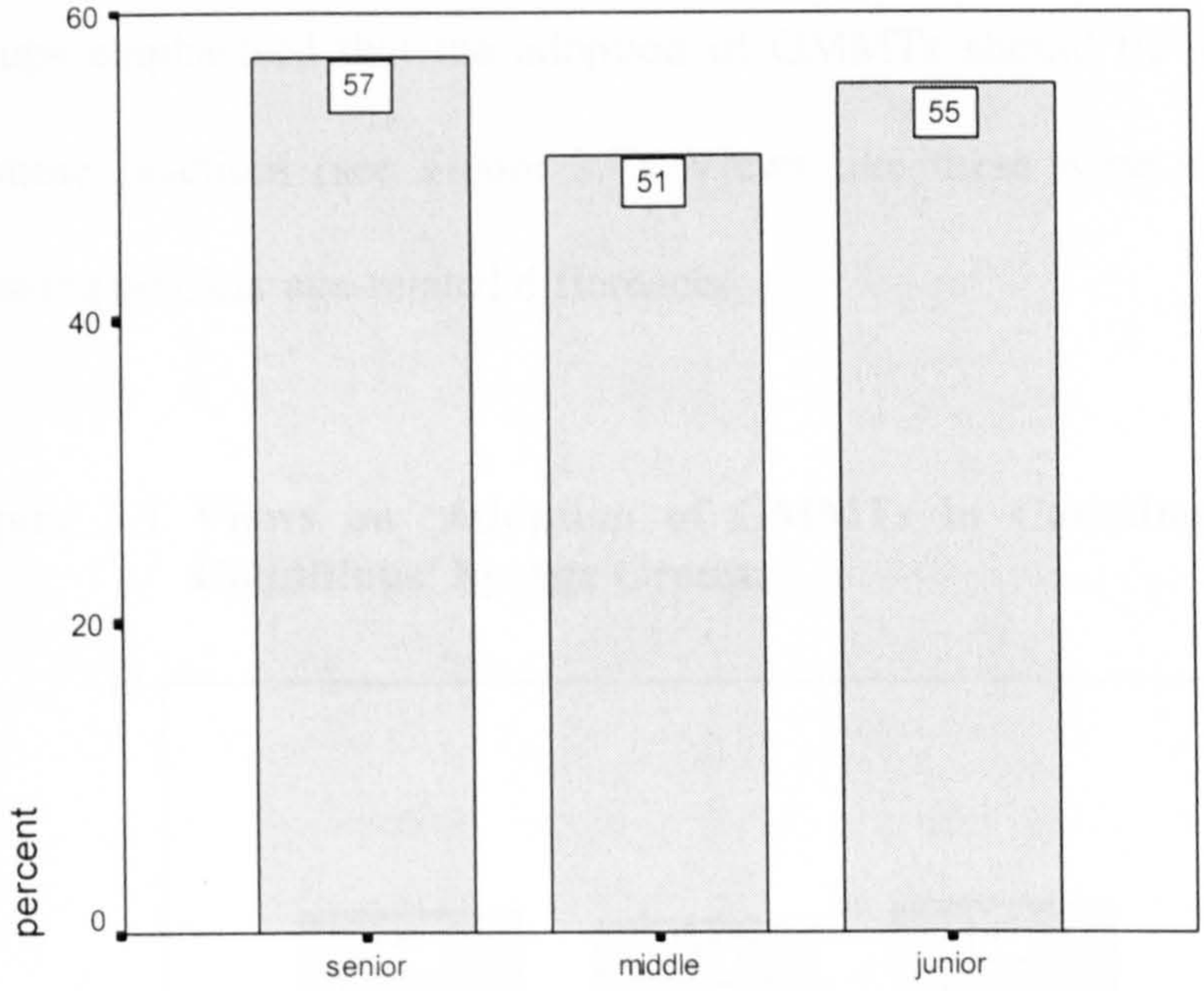
It is evident that most managers' attitude to GMMTs is positive and that there has been a change in managers' attitude to GMMTs, as a manager in Auto-1 described:

> During the Cultural Revolution, it was said that we would rather want socialist grass than capitalist seedlings. At the beginning of opening doors to the world and economic reforms, most managers took the attitude of 'wait and see' and strongly opposed the danger of all-out Westernisation. Now we realise that it does not matter that these management techniques originated from capitalism or socialism.

When I went further and looked at managers' views on the social significance of adopting GMMTs, 53% of managers answered 'to accelerate economic development and to bridge the gap with Western countries'; and 29% of managers referred to 'improved management in SOEs'. It is commonly believed that these techniques would be useful in widening their management ideas, changing their management system, strengthening responsibility, reducing waste and improving efficiency. Moreover, 17% in total said that GMMTs could be useful in increasing the capacity to compete in the global market, with 11% of managers citing 'to propel the development of civilisation, increase wealth and to improve people's living standards'. As can be seen from Figure 3.6, there was only a slight difference

in managers' views on the introduction of GMMTs for development in relation to their seniority.

Figure 3.6 Views on 'Learning GMMTs is Useful to Economic Development' by Job Level.



Total N=306

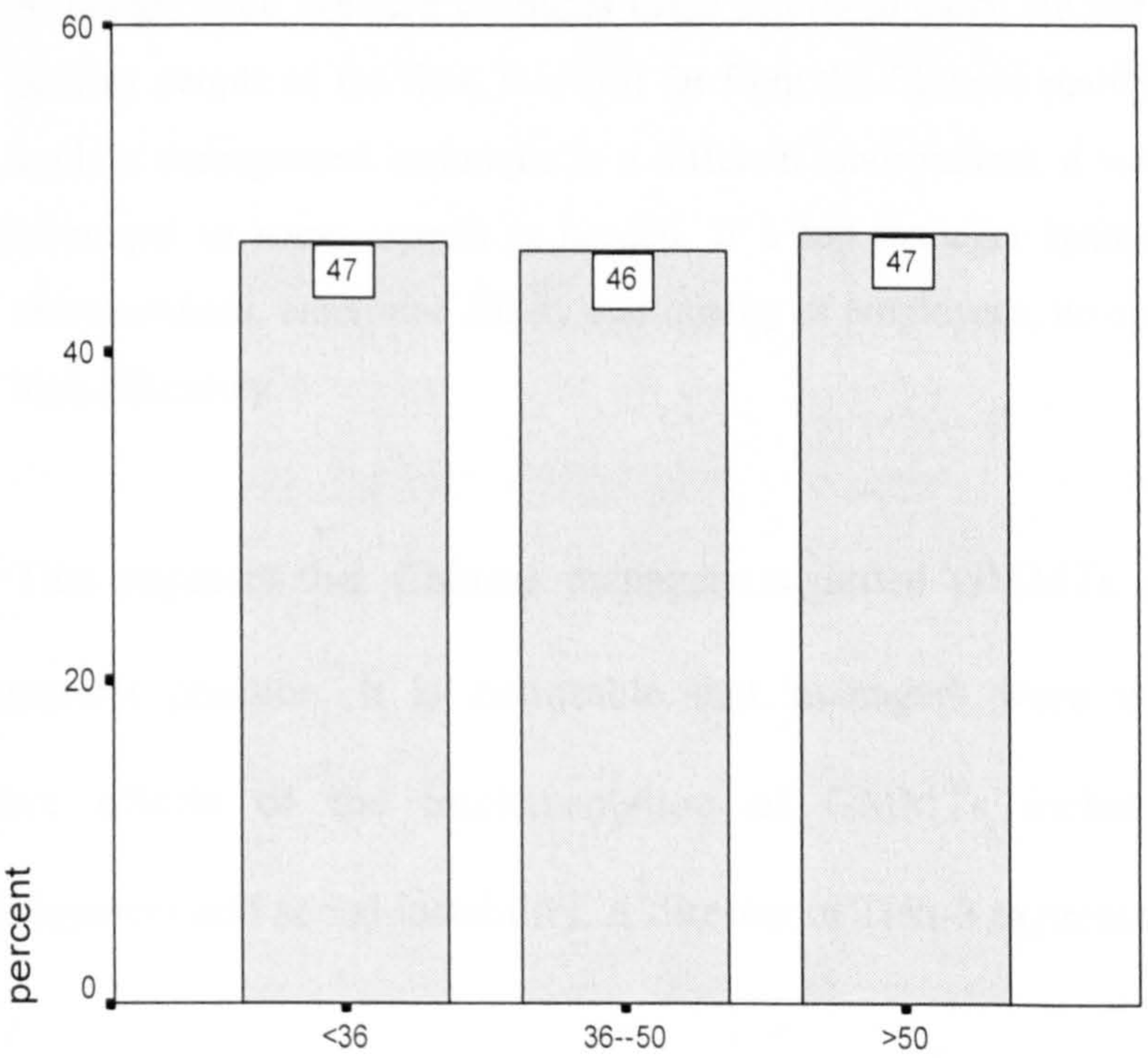
3.3.3 Managers' Views on the Factors which Affect the Adoption of GMMTs

A distinctive feature of China's politics and economy has been the dual power structure within every Chinese organisation consisting of executive management and the Party. Each has its own internal structure and has an independent reporting relationship to superior authorities outside the organisation. Moreover, in China, the weak link between ownership and property rights, in particular, the mediation of the link by government officials, set significant limits to managerial discretion (Child,

1994: 304). Previous research by Zhuang and Whitehill (1989: 64) concluded that China would not completely adopt Western management techniques and the solution to China's management problems would be uniquely Chinese in nature.

This view is supported by my finding that 47% of managers in three age groups emphasised that the adoption of GMMTs should be in combination with Chinese practices (see Figure 3.7). Views like these were shared by managers, showing no clear age-related differences.

Figure 3.7 Views on 'Adoption of GMMTs in Combination with Chinese Conditions' by Age Group.



Total N=293

This was not only a feature of the thinking of the new generation. A middle aged manager in Publ-1 comments:

Most GMMTs developed in capitalist private ownership, history, culture and the situation of Western countries. They do not completely suit our situation. The Chinese economic reforms were designed to find a distinctive path of *The Socialist Market Economy* to modernisation rather than to adopt the whole Western model. What is the exact meaning of *The Socialist Market Economy* is, still not clear. What are the characteristics of the system? There is no ready model to copy in the world, so the Chinese government was left with one solution: feeling for stones to cross the river, as Deng Xiao Ping said. Having reformed for twenty years, we have adopted some GMMTs. We should create a new management technique suitable to our industrial situation.

A manager in his 50s in Light-3 indicates:

> As far as I am concerned, GMMTs are rigid and relatively lacking in emotion. Although some Western countries make efforts to carry out the principle of picking people as the first, it is still far from the Chinese reality. In order to apply a management technique in a different environment, a variation of the technique in some aspects is needed. If a top manager ignores the social circumstances, enterprise ability and quality of employees, he cannot achieve high efficiency.

This suggests that Chinese managers regarded GMMTs as hard forms of management practice. It is noticeable that managers were worried about the negative effects of the implementation of GMMTs including increases in unemployment and social instability. A director in Text-3 expressed his feelings:

> Applying Western management techniques which link cruel competition might produce some unanticipated outcomes, such as unequal job opportunities, and unfair income distribution and weak protection of employees' interests. The profit motivation may influence our value orientation.

Some researchers have noted the influence of cultural factors in the adoption of GMMTs in China. There is a stronger emphasis on relationships, group orientation, respect for age and hierarchy in China (Easterby-Smith *et al.*, 1995: 33). Easterby-Smith *et al.* (1995: 55) described a comparative study that was carried out in matched Chinese and UK companies to investigate the sensitivity of HRM to culture. They found that in China relationships were important in the soft areas including appraisal, reward systems, the process of assessing potential and the basic stance of unions towards management. My research finding appears to support this view. As an example, 'relationships' affected the implementation of JIT, as Chen said:

> China has a tradition of establishing an order based upon personal relationships (*guan xi*). As a result, the relatively low use of JIT in supply and delivery could be traced to the reason of an atypical purchasing behaviour (in charge of enterprise management in Elec-3).

Being in the primary stage of a market economy is another factor that has affected China's ability to learn from GMMTs. The Western economy is in the post-industrial stage, with a well-developed infrastructure and market mechanism; whereas China is in the early stage of industrialisation, with an under-developed infrastructure and embryo market systems. It is obvious that post-industrial models are not suitable to the Chinese context (Fan, 1998: 211). Managers who have worked in planned economies are likely to have different ideas about managing a business to those of their Western counterparts (Child and Rodrigues, 1996: 52). The managers I interviewed have seen old ideas to be hurdles to the adoption of GMMTs:

> The Chinese lived in a closed planned economy for several decades. Old ideas which were created in the traditional planned economy were obstacles to the utilisation of Western techniques. For example, the 'iron rice bowl' has not been really broken, managers cannot dismiss workers who loaf on the job. This is far from ideal for a market economy (a top manager of Chem-2).

Both managers' and employees' quality are a related issue:

> The improvement of managers' quality would be a prerequisite for adopting GMMTs. Poor quality of top managers will cause a short term strategy and the system will be inefficient. Both managers and workers lack knowledge of GMMTs so these techniques cannot be utilised very well (a manager in Text-3 who was in charge of the production department).

3.4 Summary

This chapter has examined how GMMTs have spread and have been adopted to an extent that depends very much on economic and political triggering events and the actions of several social actors. It investigated managers' knowledge of GMMTs. It is found that the proportion of managers who were familiar with new management techniques was low. It reveals that managers in those companies which had introduced GMMTs were more likely to have related knowledge. Similarly, we found that individual educational backgrounds are a factor that caused differences between managers' knowledge but this kind of influence is not as direct and strong as the organisational factors.

It is evident that the youngest managers are the most conversant with GMMTs in general. This can be explained by the fact that younger managers are relatively

well educated and they grew up at a time when China was being opened up to the world. There have thus been more conduits for them to access international developments in management theory and practices.

This chapter also examined the sources of knowledge about GMMTs. It is evident that company practice and training are found to be most important sources. The government played a key role in the diffusion of new management techniques nation-wide. At company level, top managements' recognition of the market economy and new management techniques influenced their decision making regarding the implementation of new management techniques. Media and books are also important channels for managers to access GMMTs. University education has disseminated new knowledge and enhanced managers' abilities.

It is worth noting that joint ventures are an important source of knowledge about GMMTs, as we will see in the follow chapters. Foreign partners impose highly standardised practices which support their product or corporate brands. Chinese partners and local supplier companies are required to learn about international management knowledge and to imitate foreign management practices.

Two important implications can be drawn from this chapter. Firstly, Chinese managers generally--including younger ones--are apt to identify GMMTs with hard methods. Basically, they attempt to increase productivity through increased technological efficiency. They are aware of the importance of soft variants of GMMTs--mainly the nature of work organisation, for example, people management. But the socio-economic background and the negative aspect of

cultural traditions influenced managers to adopt the soft variants of the new techniques.

Secondly, most managers including younger ones indicate a need to adopt GMMTs in combination with Chinese reality. When Chinese managers speak about GMMTs and Chinese characteristics, they are not thinking about what happens inside the factory but about, for example, unemployment. Most Chinese managers see Western management practices as being cruel because its objective is to pursue maximum profits. However, with further market competition, Chinese managers are unlikely to maintain excess labour and are likely to seek convergence with Western management.

The following chapters will explore, in more retail, how lean production was implemented in the state components companies in Shanghai.

Part Two

Case Studies of Lean Production Practice

Chapter Four

The Coming of Lean Production

The auto industry has been a laboratory for innovation in production. Contemporary production arose in the Ford Motor Company, where scientific management and extreme mechanisation in the shape of the assembly line came together as Fordism. Recently, lean production emerged from the Toyota Motor Company. Beyond Japan, the process of convergence from mass production to lean production is now under way in both developed and developing countries.

China is the largest developing country in the world. In what sort of situation has the Chinese auto industry been? Womack *et al.* (1990), in their book *The Machine That Changed the World*, indicated a situation of inefficiency with a massive labour force in the Chinese auto industry:

> The Chinese industry is still focused inward, pursuing a combination of extremely rigid mass production in its two volume-production complexes in Changchun (No. 1 Auto Works) and Hubai (No. 2 Auto Works) and inefficient low-quality craft production in about a hundred additional vehicle-manufacturing facilities spread throughout China. This disastrous combination gives China the distinction of having the world's largest motor-vehicle industry in terms of employment (more than 1.6 million workers) and one of the smallest in terms of output (a projected 600,000 units in 1990) (Womack *et al.*, 1990: 268).

But what changes have taken place in the Chinese auto industry since 1990? Facing global competition, have Chinese managers and workers learnt from their

Japanese counterparts? To answer these questions, my research focuses on several components companies in the Shanghai Automotive Industry Corporation (Group) (SAIC) to investigate the application of lean production and related changes. This chapter briefly shows how these components companies were approaching and implementing lean production as a strategy when facing internal and external challenges. It also explores the processes and characteristics of lean production practices. This chapter starts with a general review of the implementation of lean production in the Chinese auto industry.

4.1 Lean Production in the Chinese Auto Industry

The Chinese national auto industry was born in 1953 when the No. 1 Auto Works was established in Changchun. In 1957, it manufactured the first Chinese-made vehicle called *Jie Fang*, a middle-sized truck, using techniques from the Soviet Union. In 1958, it produced the first Chinese-made car branded as *Dong Feng*, followed by the *Feng Huang* car which was produced in Shanghai in 1958. During the following 20 years (1959-1978), approximately 120 auto enterprises were set up nationwide under the planned economy. They gradually increased their production capacity, but were still at the stage of small batch production and low efficiency by 1978.

The rapid development of the Chinese auto industry took place after the economic reforms starting from the end of 1978. It was reflected by a sharp increase of annual output and fixed assets. Compared with 1979, the annual outputs of

automobiles and motorbikes in 1997 had increased by 8 and 50 times, and reached 1.58 million and 10 million units, respectively. Fixed assets in 1997 increased by 26 times and amounted to RMB 181 billion (*China Automotive News*: 17th December, 1998). These developments mainly resulted from government policies, heavy government investment, foreign capital investment, the establishment of *sanzi* enterprises (sino-foreign joint ventures, co-operative ventures and wholly-foreign-funded enterprises), and the introduction of advanced foreign production and management techniques. Many government policies were formulated during this period of time, as partly indicated in the previous chapters. These policies empowered managers to run their enterprises independently and reduced interference from government in decision-making. The Chinese auto industry received US$ 18.5 billion of investment from the Chinese government and attracted US$ 3.2 billion of foreign capital (ibid.: 17th December, 1998). It established 550 *sanzi* enterprises with companies from more than twenty countries and districts. It selectively imported more than 580 advanced foreign techniques which involved the most important procedures of motor vehicle production, such as whole vehicle production, components production, assembly technology, production equipment, research and development (R&D) and management (ibid.: 17th December, 1998). The introduction of the shareholding system, encouraged by the central government, enabled auto enterprises to increase their scale quickly through merging and share-control. Now 13 large Chinese auto companies account for more than 90% of the total output and dominate the domestic market.

In spite of these remarkable achievements including the dramatic increase of production capacity and production technology levels, the optimisation of auto

product structures and the improvement of the auto industry structure, in recent years most Chinese auto companies have still faced the serious problem of low efficiency. This problem became much more acute with fierce competition in the buyer market, as can be seen from Table 4.1. Table 4.1 presents key data of the seven large Chinese automotive groups in 1998. Three out of seven groups were loss-makers and wanted to be revitalised. It is worth noting that SAIC did quite well even under poor market conditions. The experience of SAIC may throw light on the development of the Chinese auto industry.

Table 4.1 Performance indicators for Seven Large Auto Groups in 1998.

Group	Sales revenue (billion RMB)	Vehicle output (car) (10,000 units)	Profit (million RMB)	Output-capital rate (%)	Profit-cost rate (%)	Productivity * (RMB/year person)
SAIC	**74.9**	**23.5 (23.5)**	**5500**	**20.9**	**17.8**	**174,069**
Group-1	33.4	28.9(8.1)	570	4.47	1.95	54,738
Group-2	15.0	19.1 (3.6)	-94	1.75	-0.7	25,767
Group-3	11.9	15.5 (10)	530	6.84	5.5	53.785
Group-4	8.7	8.2 (0.8)	-200	3.5	-0.7	31.785
Group-5	5.0	8.9 (0)	-91	0.73	-2.27	11,466
Group-6	6.5	6.9 (0)	230	6.59	3.82	28,963

Note: Productivity*=Net production value of labour productivity of total workers (RMB/year person).

Source: statistics made by <*China trade commence automotive association*>, <*SAIC Annual Report*>, 1999: 4. Group1-6 refers to six big auto groups.

Management in the auto industry gradually realised that modern management ideas, strategies and techniques played important roles in the improvement of competitive capacity. Lean production is such a key management system which combines new management philosophy with distinctive practices. The history of

lean production in the Chinese auto industry can be traced back to the beginning of the economic reforms. Management learnt about lean production either by visiting foreign companies and receiving training abroad, or by inviting foreign experts to give lectures in China.

The earliest report about the implementation of lean production came from Changchun No. 1 Auto Works. In 1978, a director-led delegation of this firm spent six months in five famous Japanese automotive companies to learn about the Toyota production system. After returning to their firms, the members of the delegation introduced the Toyota production system amongst middle managers and workers. They also tried to implement several techniques into their firms in line with their aspirations at that time. In 1981, the director of Changchun No. 1 Auto Works invited Taiichi Ohno, a pioneer of lean production, to visit his firm and to introduce the Kanban system (Feng, 1995: 179). As a result, Kanban management together with mixed-flow production and QCs were applied in a rudimentary way. However, these lean production practices were suppressed by the planned economy because there was no market mechanism in the early years of the economic reforms. With the development of the market economy, the Chinese auto companies were urged to systematically improve product quality and production efficiency through the implementation of lean production. In 1989 when No.1 Auto Works imported gearbox production technology from Japan, it adopted several related management techniques such as cellular manufacturing, one-piece flow and JIT.

In 1991, the publication of the Chinese version of the book The *Machine That Changed the World* (Womack *et al.*, 1990) symbolised a new era of lean production

application in China. Thereafter, a large number of Chinese books about lean production appeared in the bookshops. These publications are significant sources for diffusing lean production in the context of the demands of the joint venture car assembly companies and intensive market competition outlined below. In addition, the Department of Mechanical Industry that, at that time, supervised the whole Chinese engineering industry called for the application of lean production within a competitive environment. The China Association of Enterprises also made efforts in the diffusion of lean production because lean production was rapidly diffusing throughout the world. The Chinese auto industry was facing rapidly growing competition in the domestic market and had to prepare for international competition because China would join the WTO and open the domestic market to global players. Without a doubt, lean production was considered as 'the best practice' for companies to survive.

Table 4.2 The Implementation of Lean Production by Company.

Companies	Implementation
No.1 Auto Group	JIT, Kanban, Cellular manufacturing, Team working, TPM, Lean sale, Cost cutting.
SAIC	**JIT, Kanban, Team working, Kaizen, MRPΠ, Lean management, Cost cutting etc.**
Company-1	Quality control
Company-2	Kanban management, Supply chain One piece flew.
Company-3	Kaizan, JIT
Company-4	MRPΠ (Manufacturing Resource Planning)

Source: Feng, (ed.), 1995: 3; Shen, *et al.*, (ed.), 1995: 384; Wang, 1999: 438; Qi, 1999; Du, 1999: 24.

In 1995, lean production had been implemented in five Chinese automotive companies (Shen *et al.*, 1996), one of them was Auto-1 in SAIC which started to apply lean production in 1993. During the research which was carried out in 1999, I found that several auto groups claimed that they had implemented lean production at a variety of levels (see Table 4.2). Amongst them, No.1 Auto Group and SAIC made impressive achievements in the application of lean production, but it can hardly be said that lean production has been significantly diffused into the whole Chinese auto industry. In 1999, Du, an engineer at the Lean Enterprise Centre of Excellence, China Automotive Technology and Research Centre, published his paper *Lean Production: the Best Choice for Chinese Enterprises* (Du, 1999) and called for a popularisation of lean production. The Lean Enterprise Centre of Excellence has trained people to understand lean production techniques (one-piece flow, kanban etc.) and lean thinking to cope with waste in the value stream.

It has been hypothesised that manufacturing strategy should be linked to operational performances (Hanson and Voss, 1993). As shown in Table 4.1, the performance of seven large auto groups exhibited huge differences. SAIC had the best performance in profit, the output/capital rate, the profit/cost rate and productivity. For example, its productivity was three times as high as that in Group-1 and 15 times as that of Group-5, and its profit/cost rate was three times as high as that of Group-3 and four times as that of Group-6. Some important questions arise: how did SAIC achieve such an excellent performance and competitive position? Was this performance associated with specific modern management technique--lean production? The following section will address these issues by presenting the research results from the auto components companies in SAIC.

4.2 Description of SAIC and Its Auto Components Companies

SAIC was established on the basis of the Shanghai Automotive Industrial General Corporation in September 1995. It has 60,000 employees and consists of over 50 enterprises including whole-vehicle manufacturing companies and component supply enterprises. Now it is one of the largest auto manufacturing groups in China. SAIC has co-operated in its 40 firms with more than 20 world famous auto companies. In 1985, it established the first joint-venture company in China--Shanghai Volkswagen (hereinafter referred to as SVW), with the German Volkswagen Corporation (hereinafter referred to as GVW). The initial investment in the joint-venture was RMB 350 million in total. With rapid development and further investment, the assets of this joint-venture reached RMB 4.6 billion by 2000. In 1997, SAIC set up the joint-venture company Shanghai General Motor (hereinafter referred to as SGM) and Pan-Asia Automotive Technology Centre with the US General Motor Company and achieved a total investment of US$ 1.57 billion.

Table 4.3 The Main Economic Performance Indicators for SAIC from 1994 to 1999.

Year	Output of automotives (10,000 units)	Gross output value (billion RMB)	Sales value (billion RMB)	Total profit (billion RMB)
1994	11.35	19.55	36.26	4.01
1995	16.00	29.12	53.36	5.47
1996	20.00	39.13	65.45	6.61
1997	23.04	43.76	73.35	7.00
1998	23.50	45.08	74.94	5.52
1999	25.40	53.65	88.30	6.24

Sources: *Shanghai Economy Year Book*, 1995: 60; *SAIC Annual Report*, 1999: 4.

SAIC produces a wide range of motor vehicles and components. The main products are the Santana, Passat and Buick car; motorcycles; tractors; trucks and internal combustion engines. During a period of strong market competition, SAIC sold 231,000 units of the Santana series car and 20,000 units of the Buick car, occupying 45% of the domestic market in 1999. Comparing 1999 with 1994, its auto outputs increased 224%, the gross output value grew by 274%, the sales value rose by 244% and its total profits went up by 156%. SAIC also started to advance into the overseas automotive market and exported car products of US$ 87.19 million in 1999. The main performance indicators of SAIC are summarised in Table 4.3. My case study focuses on the eight state-owned components firms and one bus manufacturer (Auto-8) in SAIC. Table 4.4 lists their organisational forms, ownership and major products.

Table 4.4 The Type, Ownership and Major Products of the Sample Enterprises.

Enterprise	Type	Ownership	Major products
Auto-1	Works	SOE	Transmission assembly
Auto-2	Co. Ltd.	SOE jointed by capital	Chassis system, Truck
Auto-3	Works	3 SOE, 3 JVE firms	Spring
Auto-4	Corporate	3 SOE, 1 JVE firms	Bearings, Bushings,
Auto-5	Corporate	SOE	Stamping, Truck, Bus
Auto-6	Co. Ltd.	SOE jointed by capital	Die casting, Oil pump
Auto-7	Corporate	SOE	Brake hoses, Flexible cables
Auto-8	Co. Ltd.	SOE	Bus, Coach
Auto-9	Works	1SOE, 2 JVE firms	Clutch

Source: Booklet in each enterprise; Lu, (ed.), 1999.
Note: SOE=state owned enterprise, JVE=joint-venture enterprise.

Table 4.5 gives their establishment date, employee numbers and major customers. Although I refer to them as state-owned enterprises, some are jointly funded by small amounts of foreign capital. Their management is totally staffed by Chinese managers and there are no foreign managers on site. Eight firms are car components manufacturers and their major customers are SVW and SGM. Auto-1, Auto-2 and Auto-3 are leading car components firms in China. Some enterprises such as Auto-7 and Auto-9 have annual production capacities of over 300,000 units.

Table 4.5 The Establishment Year, Employees and Customers of the Sample Enterprises.

Enterprises	Establishment (original) year	Employees number	Customers
Auto-1	1997 (1925)	3,700	SVW, SGM, BrazilianVW
Auto-2	1992 (1912)	8,560	SVW, SGM
Auto-3	1998 (1937)	960	SVW, SGM, No.1 Works
Auto-4	1994 (1965)	2,500	SVW, SGM, WHCitroen
Auto-5	1989 (*)	5,928	SVW, SGM
Auto-6	1992 (*)	2,000	SGM
Auto-7	1993 (*)	2,000	SVW, No.1 Works,
Auto-8	1994 (*)	3,000	Pu Jiang Bus
Auto-9	1956 (1938)	2,153	SVW, No.1 Works, German F&S
Total		30,801	

Source: Booklet in each enterprise. * data is unavailable.

Beside car components, these enterprises also produced components for the other type of vehicles, for example, Auto-1 manufactured transmission assemblies for 15-ton heavy lorries and SH50 tractors and exported its products to USA and other Western countries. These firms had faced different market competition and had varying performances. For instance, Auto-1, Auto-2 and Auto-3 were profit

makers. By contrast, Auto-5 and Auto-6 were suffering from financial hardship. Their organisations and management strategies affected the extent to which lean production was implemented.

4.3 Lean Production Practice in the Auto Components Companies

Womack *et al.* (1990: 19) claim that 'new ideas emerge from a set of conditions in which old ideas no longer seem to work. This was certainly true of lean production, which arose in one country at a specific time……'. What specific reasons made managers in the auto components companies in SAIC apply lean production? Where did managers get their ideas? What were the processes and characteristics of its application? These questions have been pondered throughout my research.

4.3.1 Context and Strategy

4.3.1.1 The Challenge: Manufacturing Components Locally

In 1985, as a milestone in the development of the Chinese auto industry, the first joint-venture company SVW was established. As a partner, German Volkswagen hoped to extend its overseas market and to use cheap labour whilst SAIC wanted to utilise foreign capital and technology in order to build up a modern auto manufacturing base. With the support of the government, SAIC made great efforts to establish SVW. During the first two years, all components of Santana cars made in SVW were imported from foreign companies because of the lower technical level of the components manufacturers in SAIC. Within this situation, on the one hand, SVW had to spend a lot of hard currency to import parts. On the other hand,

components firms in SAIC were struggling to survive. To change this situation, the metropolitan government set a limit on the extent to which SAIC could import components. SAIC could not easily obtain funds from banks.

So, what happened at SAIC? Basically, SAIC decided to manufacture the components of Santana cars by itself which was a unique solution for the components enterprises' survival. The 'Santana car components localisation' project was supported strongly by the state and local government because it was associated with the development of the Chinese auto industry. The project was set up in 1987 and was expected to produce 60% of total components locally within three years. However, all components made locally had to reach all quality standards set by the GVW. It meant that the level of production and technology in these enterprises would substantially increase from the 1950s level to international levels by the late 1980s.

4.3.1.2 The Problem: the Situation of the Companies

Every employee in SAIC recognised that they had to make enormous efforts to realise the Santana car components localisation because the company's production capacity and technology levels were well behind that of advanced countries. We are taking Auto-1 as an example but other enterprises had the same or even worse situations at that time.

In 1987, Auto-1 had much less advanced technology and equipment than at present. The facilities could be described as less automatic and brought several

kinds of problems to production activities. Production was organised on the basis of separated shop floors with a closed single cycle and was pushed according to a plan. The utilisation rate of machinery was low (only 36%). The enterprise suffered from several different types of waste. It was common to have excess production and purchase of materials, with huge inventories being the most striking results. For example, in 1987, Auto-1 had a sales income of RMB 36 million but the inventory cost was RMB 13 million. The surplus people and excess departments in the enterprise had been a waste of human resources.

Looking at the output of products, Auto-1 produced 7,000 transmission assemblies in 1987, but it was only 0.2% of the output of GVW. This transmission assembly copied the Bazy (the model of the 1950s) which was 30 years behind the modern Santana car. Furthermore, some employees had poor quality consciousness. The first passing rate of assembly quality was 39%. In general, there was an urgent need to fundamentally change the production and organisation system in order to catch up with the production levels of GVW.

4.3.1.3 The Strategy: Adoption of Lean Production

Lean production arose in SAIC at a specific time when the company had a joint venture with GVW. By interviewing managers and workers during my fieldwork, three main reasons to adopt lean production in SAIC are identified. Firstly, management realised that the introduction of production technologies needed to be associated with the introduction of advanced management techniques. In order to reach the quality standards set by GVW, management in the component supply

enterprises in SAIC were under pressure and tried to learn about lean production following SVW. In addition, management was inspired, to a great extent, by the book *The Machine That Changed the World* (Womack *et al.*, 1990), from which SAIC managers gained information about the diffusion of lean production around the world. Finally, management in some Chinese-Japanese joint-venture components enterprises copied Japanese practices. Top managers visited these foreign enterprises and imported new management ideas. These will be discussed, in detail, below.

Since 1987 when SAIC decided to produce the components of Santana cars locally, all enterprises in the sample have purchased a great deal of sophisticated equipment from foreign countries. Importing equipment provided opportunities for managers and engineers, as well as workers, to learn about advanced technology and management from abroad, as Wang recalled:

> With 42 engineers and workers, I disassembled a second hand assembly line from a German firm in 1988. I saw the equipment originally, observed how it worked and took notes. During three weeks, what impressed me were good organisation and rigorous management in the German firm. We would not be successful if we only imported equipment without adopting modern management techniques (a production manager in Auto-1).

Xie, one of members in Auto-4 who transported an electroplate production line from England, spoke of the same feelings:

> In a British firm, I saw each worker had responsibility for product quality. I was ashamed because we lagged far behind them. When a modern production line is introduced, our workers should improve quality consciousness.

Having invested in new technology for four years, top managers in SAIC spotted the fact that although the company had improved automation levels it still lacked comprehensive product standardisation efforts, logistic systems, highly skilled workers, flexibility in production and so on. These disadvantages were barriers to technological development. Indeed, modernisation is a multi-dimensional and dynamic process. It implies an integral change in technological foundations as well as in operational systems, the managerial and production processes and labour organisation. However, they had no clear idea about what management techniques would be suitable.

I visited SVW twice during the period of the research. The production manager Yao, who gained a Masters degree in a famous University in Shanghai, told me that SVW implemented lean production practices due to the requirements of management in GVW:

> Management in SVW was inspired by the lean production carried out in GVW which set up the Kanban management in 1992. Our company's German director visited Toyota in Japan as soon as he knew about this. He put forward a proposal to learn about lean production in SVW, designed initially to carry out Kanban, QQM (one kind of quality management), team and KVP[2], (one kind of Kaizen activity). The engine plant was chosen for this trial.

In September 1992, SVW invited a senior advisor J. Park of GVW to introduce lean production. He was an expert in studying lean production and a professor in the Department of Philosophy and Social Science at Berlin University. Later, the newsletter *Shanghai Automotive* in SAIC published the article *Lean Production--That Changed Peoples' Way of Thinking*. The word 'lean production'

appeared in the enterprise's newsletter for the first time when most people had no knowledge about lean production. Yao believed that this was a sign that SAIC would implement lean production following SVW. A manager in Auto-1 said:

> We supply components for SVW which does not accept any defective products. SVW has adopted lean production so we have no choice but to adopt those principles of lean production to achieve quality assurance.

By that time, the Chinese version of the book *The Machine that Changed the World* was published. The China Automotive Industry General Corporation received its English version from the organiser of the International Motor Vehicle Programme (IMVP). Director Lu, at SAIC headquarters, was spurred by the advocacy of the authors Womack *et al.* (1990: 225):

> Our conclusion is simple: Lean production is a superior way for humans to make things. It provides better products in wider variety at lower cost. Equally important, it provides more challenging and fulfilling work for employees at every level, from the factory to headquarters. It follows that the whole world should adopt lean production, and as quickly as possible.

He firstly required top managers of enterprises to study this book. A top manager remembered what happened to him:

> At the beginning, I could not understand the book. Our production systems were totally different from that of the Japanese so I lacked relevant knowledge. When I read a page I had to go back to the previous pages. I mean, it was totally new to me.

Hua insisted that director Lu played a key role in applying lean production:

Director Lu seized the opportunity of the Santana car components localisation to apply lean production. By visiting America and Japan, he saw the rapid diffusion of lean production and realised that the philosophy of lean production was what SAIC needed to learn. So director Lu made a good decision to build up the lean production system in SAIC (a vice-chairman at the SAIC trade union headquarters and a former enterprise director).

In addition to top management's advocacy, the association with the foreign joint-venture enterprises provided an advantage in accelerating the process of implementing lean production because some joint-venture companies implemented lean production following their foreign partners. For example, Auto-10 joined by a Japanese company had carried out labour saving activities and the 6S. 6S originates from Japanese words: Seiri, Seiton, Seiso, Seiketsu, Syukan and Shitsuke, meaning cleanout, organisation, clean and check, standardise, discipline and custom.

In October 1992, 16 top managers from auto components companies in SAIC went into training in the Japanese Company, where managers had an opportunity to observe facilities and operational practices. Their attention was particularly caught by the orderliness and cleanliness of the shop floor, as well as by the organisation in manufacturing cells and the co-operation amongst workers. They learnt that behind what they saw were the ideas of high quality, the elimination of waste and continuous improvement. As a result, management was convinced of the need to implement dramatic changes in their operations to achieve the desired levels of productivity. The training lasted one month and was reported in the newsletter *Shanghai Automotive*. One manager said this training made it easier to understand the book *The Machine That Changed the World*. He came to know the meanings of Kaizen, Kanban, 6S and so on. Hua continued to introduce:

The management's ideas and plans to adopt lean production were published in *Shanghai Automotive* during the first half of 1993. Each company had a different focus such as quality control, reduction of lead time, production management, training, 6S and so on.

4.3.2 The Process of Applying Lean Production

The introduction of lean production in auto components companies in SAIC was indeed a revolution in management because most of these old SOEs had old behaviour patterns formed under the planned economy. It took time practising lean production. In general, the implementation of lean production was done through three main phases.

4.3.2.1 Experimental phase

Having made the overarching framework, top managers in SAIC tried to structurally alter the manufacturing process from the old principles of batch production to the highly efficient JIT system in order to reduce waste. The media propaganda experiment took place from 1992 to the end of 1994.

Auto-1 carried out the lean production experiment firstly amongst the SOEs in 1993. This was because that a fire broke out on a shop floor and equipment was damaged with substantial losses being suffered. The fire highlighted an urgent need to change old production methods and to strengthen management control, as well as quality control which was mentioned above. Lean production was introduced in order to achieve these goals.

On 6th August 1993, director Chen in Auto-1 put lean production on the agenda at a middle management meeting. He decided to establish a 'lean production promotion leading team' and a 'risk production office' to guide lean production practices. The head of the production department Wang, the former chief of the 'risk production office', explained the connotations of risk production:

> We did take risks to apply lean production at the beginning. We tried to design one-piece flow of materials and to adopt the Kanban system. We called lean production 'risk production' because working with the tighter time and the limited work-in-progress inventories would cause unpredicted risks. For example, the risk would happen when a machine broke down or a worker could not produce on time.
>
> The risk I am talking about is the possibility of harmful ramifications. I run a risk because lean production might create uncertainty and unpredictability. Then I tried to cope with this uncertainty, to bring it down to a minimum and to eliminate the risk.

In Auto-1, workers were trained to operate more than one machine and participated in zero defects management. On the shop floor, a production spot was focused upon as a centre, an operator as a subject and a production manager as a leader. This formed an environment that all people serviced for the first line workers to create value and to reduce waste. Auto-1 was a pioneer in the application of lean production in SOEs.

The Party committees and the trade unions supported the implementation of lean production and participated in its promotion. They also encouraged and organised party members and unions' members to implement management's

decisions. Being an excellent party member required not only team working and multi-tasking operation, but also making suggestions. The unions' role in lean production will be discussed in Chapter 8.

4.3.2.2 Widespread Phase

The management launched the lean production programme on a wide basis during the end of 1994 to 1997. At the end of 1994, a meeting was held in Auto-1 where director Lu asked all companies to learn lean production as in Auto-1. The SAIC headquarters also set up a 'committee for guiding lean production'. Implementing lean production was the main economic project in 1995, as top management in SAIC headquarters announced:

> The central theme of the economic projects is to apply lean production company-wide in order to reduce production costs by 5% this year. The ways to achieve it will be: (1) to strengthen management at the point of production and to carry out team working; (2) to co-operate with suppliers and to adopt JIT production; (3) to carry out target cost management and economic audits; (4) to make a quality guarantee system, to practice zero defects activities and to increase products without quality checking (*Shanghai Automotive*, 1st, January, 1995).

Intensive training in the new programme took place firstly at different levels. Managers and workers were given lectures on the importance of adopting lean production and a knowledge of the basic concepts of lean production techniques. Several textbooks for training have been published since 1995, for example, *The Concept and Method of Lean Production*; *Introduction to Toyota Production*;

American Talk about Lean Production; *Team Working*; *The 38 Examples of Lean Production*. After 8th, January 1995, all employees could gain knowledge of lean production from the newsletter *Shanghai Automotive*. The topics included 'what is lean production', 'what is waste' and so on. From the newsletters, workers also got information on the process of utilising lean production. For instance, they knew which workshop was chosen firstly by their directors to implement lean production and which technique would firstly be introduced in their enterprises.

In 1994, Auto-3 redesigned the spring production line using suspension chains. By this time, the kanban system started to be used and team working was implemented to make progress in this firm. Auto-2 successfully implemented team working to improve product quality in1995. In this year, Auto-5 restructured 16 production lines and learnt JIT for capital rationalisation by cutting down work-in-progress inventories and final product storage. It also applied team working in line with suggestions making. In 1996, Auto-1 put forward the 'six no permission' working method, regarding service for first line production workers. The 'six no permission' stipulates that: (1) workers must complete their daily production targets, no permission will be granted to delay to the next day; (2) once any malfunction of the machine is found, no permission to produce will be granted until the machine is fixed; (3) no permission to produce will be granted when a worker is using a broken tool; (4) when any defective part is found, no permission to produce will be granted until the problem is resolved; (5) when an operator is absent, no permission to produce will be granted until another worker can take this place; (6) no permission will be granted to ignore kanban. Moreover, the company applied 'weekly planning' to reduce plan cycles and implemented Manufacturing Resource

Planning (MRPΠ).

In the auto components companies in SAIC, quality management with its own unique style has been formed through years of trials and practice. Especially, managers have made tremendous efforts to pursue their goals such as zero defects production, zero work-in-progress inventories and zero malfunctions of equipment, and these will be analysed in Chapter 5.

4.3.2.3 Improvement Phase

The improvement phase started in 1998. Having made changes in the production techniques and organisation, the SAIC management paid attention to 'continuous improvement' or Kaizen, applying the principles of lean production to reduce costs more broadly.

SAIC put forward the suggestion of implementing lean management in October 1999. Management intended to popularise good experiences in lean sales practices, lean investment strategies, lean procurement policies and the exploration of new products, with an increasing priority in R&D. As an example, world-wide procurement was used in SGM, and new products were designed in SVW. The Shanghai Auto Marketing Corporation is a pioneer in applying lean sales practice.

The key activity of the improvement phase was cost management concerning financial costs, sale costs and management costs. In particular, the YT model was advocated. It will be discussed in Chapter 7.

Whilst cost management was a key theme in the improvement phase, developing a 'learning organisation' was another practice which was used to continuously improve the quality of employees. I will discuss this technique in Chapter 7.

4.3.3 The Characteristics of Lean Production Practice

Management in the auto components companies tried to adopt lean production in their own environment to reach the best results. The practices of lean production were characterised by: (1) being in harmony with the building up of the 'sample production zone'; (2) being consistent with 'crisis management'; (3) diffusion at various speeds amongst different enterprises.

4.3.3.1 Building up a 'Sample Production Zone'

The original 'sample production zone' was built up in 1988 when the project 'Santana car components localisation' was set up. This was a strategy to form a modern production environment in order to improve the rate of the Santana car components localisation. All workshops or assembly lines which produced the Santana car components were asked to be a management model in enterprises. The 'sample production zone' was introduced to rationally restructure people, machines, material resources and to carry out stricter management in order to achieve high quality. Every enterprise made efforts to build a 'sample production zone'. The management in the SAIC headquarters assessed workshops and gave the title of

'sample production zone'. What is the relationship between the building of the 'sample production zone' and the application of lean production? Hua indicated:

> The establishment of the 'sample production zone' was a special way to realise components localisation. The 'sample production zone' was also chosen as a pioneer of implementing lean production because the 'sample production zone' had proved to be an effective way of improving on-the-spot quality control which laid a good foundation for adopting lean production. On the other hand, the 'sample production zone' should be injected with new production techniques. Lean production was added into the assessment content of being a 'sample production zone' in 1995.

A report showed that 90% of the 'sample production zone' had steadily improved quality management due to the application of lean production in 1996.

4.3.3.2 'Crisis Management'

In September 1993, director Lu in the SAIC headquarters put forward a suggestion for 'crisis management'. He wanted all employees to know that their company was facing a life or death crisis and the key strategy to overcome this crisis would be the implementation of lean production. Chen explained the relationship between 'crisis management' and the adoption of lean production:

> 'Crisis management' is concerned about the future of our company. It was useful to understand the importance of learning lean production. It made people realise that we should adopt lean production if we wanted to survive (in Auto-4).

Hua mentioned two special reasons for carrying out 'crisis management'. One was

the lessons learnt from America. Another was the arrogance of some employees because the 'Santana car components localisation' programme made progress:

> After visiting GM in America, director Lu found that GM saw the crisis behind its prosperity. However, SAIC was just at the beginning of development. At this time, some employees had the idea that if the Santana car faced difficulties in surviving then other auto enterprises could not live at all. It was a very dangerous idea. Indeed, SAIC was intimately involved in the Santana's development. In a very real sense, we shared our destinies with the Santana car. However, the Santana car faced two basic crises: (1) it was a single product. We needed to develop new and attractive products that were able to stay in the market longer; (2) the high costs of the product. Compared with national and international prices, the price of the Santana car and its components was high. It was weak in the cost-based competition because some other car companies in other cities have caught up with Shanghai and produced low priced cars. Moreover, when China joins the WTO, foreign car components enterprises with cheaper and higher quality can easily enter China. The competition will extend worldwide. When a crisis does occur we shall be too late to survive.

SAIC management popularised lean production, as a strategy, to overcome the current crisis at that time. Management concentrated on fulfilling their goal with minimum inventories and defective products, and maximum quality and efficiency. They tried to reduce costs over a very wide range of areas including manufacturing costs, sales costs, administrative costs, and even capital costs.

4.3.3.3 Diffusion at Various Speeds

My investigation suggested that not all firms adopted lean production system equally. Lean production was implemented well in some enterprises whilst it was

only learnt by other enterprises to the first stage. Taking the Kanban system as an example, some enterprises built up the Kanban system in 1994, some had just started by 1999. Whilst one enterprise had practiced Kaizen for five years, some workers in other enterprise had not heard of it. Differences also existed on the different shop floors within one enterprise. Imbalances amongst enterprises and shop floors are reflected in my survey findings. I discovered that the workers surveyed had different experiences of management practices associated with lean production (Table 4.6).

Table 4.6 Worker's Different Experiences of Management Practices Associated with Lean Production by Firm.

Unit: %

	Auto --1	Auto --2	Auto --3	Auto --4	Auto --5	Auto --6	Auto --7	Auto --8	Auto --9	A*
1	89	78	89	84	77	80	100	68	74	83
2	92	83	86	83	69	82	100	68	74	83
3	94	84	88	91	74	82	100	76	91	87
4	90	82	78	83	75	73	100	75	65	82
5	95	94	88	92	75	81	84	75	69	85
6	94	91	91	92	80	81	84	80	74	86
7	93	91	88	87	80	83	98	89	82	88
8	96	87	86	91	79	85	96	88	95	89
9	87	79	88	74	75	72	96	77	70	81
10	96	92	91	91	84	91	100	94	85	92

Note: 1=one-piece flow, 2= Kanban, 3=multi-tasking operations, 4=zero inventories, 5=zero defects, 6= team working, 7=Kaizen, 8=TPM, 9=MRP, 10= cost cutting A*=Average. The sum of row percentages is not 100% since there are more than one technique workers had experienced.

Table 4.6 indicates that most workers had experienced cost cutting exercises, which reflects the smallest difference between firms (100% in Auto-7 and 84% in Auto-5, respectively). However, the biggest gap exists amongst enterprises in terms

of zero inventories, 100% in Auto-7 and 65% in Auto-9. It is no surprising that workers in Auto-7 who had experience of one-piece flow, Kanban, multi-tasking operation and zero inventories were more knowledgeable than those in other enterprise because these techniques related to JIT production. By contrast, the less that workers claimed that they had participated in lean production the less there was utilisation of lean production in these enterprises. It is confirmed that the percentage of workers in Auto-5 and Auto-8 who participated in these activities was less than those workers in other enterprises. This suggests that these two enterprises have not adopted JIT very widely.

What accounts for these differences? During the research, most managers told me that the suppliers to SVW, a joint-venture company, had significantly better practices than other kind of companies because SVW had a quality standard which forced their suppliers to strengthen management. Auto-8 manufactured buses and Auto-5 mainly produced trucks, and this was part of the reason why they lagged behind other enterprises. Is there any other reason? Chen, a production manager in Auto-4 gave his opinion:

> Adopting new techniques was restricted by objective conditions. You see, the old shop floor's poor layout needed to be destroyed to realise one-piece flow. It was impossible to change all layouts at the same time. It would take time.

However, in the state-owned companies, management was considered an important factor which affected the extent to which lean production was adopted. Hua insisted that the top manager in the enterprise played a dominant role in adopting lean production:

Indeed, the role of a top manager is especially important in the implementation of lean production. If a top manager intended to adopt lean production and did his best to implement the ideas of lean production, the enterprise would yield many fruits. However, if a top manager did not want to adopt lean production, even if other employees were enthusiastic about it, the progress would be slow. The positive effort of top managers is required to maintain the momentum of improvement.

Gu, a director of the micro economy department in the Shanghai Academy of Social Science, believed that managers were very important figures in popularising lean production:

> The implementation of lean production should be through the company's own initiative. Although management were asked to adopt lean production by the SAIC headquarters, they had no confidence to carry on when they were worried about whether workers followed. If managers saw the application of lean production as surplus and excessive demands, they could not manage the enterprise well. Only if managers were aware of the importance of using lean production as a last resort could they adopt lean production without any distracting thoughts (Gu, 2000).

4.4 Summary

This chapter has described the development and challenges of the Chinese auto industry during the age of economic reforms. The auto industry faced intensified competition from foreign companies which had adopted the new technique of lean production. There seems to be more or less recognition of lean production amongst the Chinese auto companies, reflecting a variety of degrees of application. As we have seen in this chapter, some state components companies in SAIC are in the

process of imitating the lean production model.

It has been seen that one clear, and direct, mechanism for the introduction of lean production is the existence of joint venture companies, which can impose high standards based on their practice in other countries. For example, companies supplying components to SVW were under pressure to achieve quality standards, so these suppliers, to a joint-venture company, had significantly better practices than other kind of companies. Whilst the joint-venture companies accelerated the diffusion of lean production, the top management in SOEs played a dominant role in the utilisation of lean production. This was a reason why lean production was adopted to a different extent in different companies. This chapter gave the general characteristics of the application of lean production. However, it seems that auto components companies in SAIC overall are in the early stage of the adoption of lean production although a few companies are well underway.

Having given a general introduction to components companies in SAIC and its application of lean production, the following chapters will, in turn, examine details of the application of the lean production system (Chapter 5); its impacts upon workers (Chapter 6); the changes in work organisation (Chapter 7); and the role of the trade unions in the new environment (Chapter 8).

Chapter Five

Lean Production and Elimination of Waste

Lean production is considered, by some sources, as a universal best management technique, which is distinguished by the elimination of waste (for example, Womack *et al.*, 1990; Kenney and Florida, 1993). Management in the auto components companies of SAIC has implemented lean production, resulting in great changes in their production system and work organisation. This chapter focuses on the application of lean production in more detail. It explores how this new production system works by presenting its basic ideas and goals with the various techniques used for achieving them. Moreover, it describes how managers in the components enterprises built up their lean production systems; where manager's ideas came from; and exactly what they did. Furthermore, it also provides an initial account of how managers and workers viewed the resultant changes.

5.1 The Understanding of Lean Production

Womack and Jones advocated the thinking way of lean production, 'lean thinking is lean because it provides a way to do more and more with less and less--less human effort, less equipment, less time, and less space--while coming closer and closer to providing customers with exactly what they want' (Womack and Jones, 1996: 15). During the research period, I found that the advantages of lean production had been recognised by management and workers I interviewed in the auto components

companies. For instance, 'lean production aims at the maximum output with minimum input' (Wang and Zhong, both middle managers in Auto-1); 'the goal of lean production is to eliminate waste, to cut costs and to improve productivity' (Zhu, a head of shop-floor in Auto-4); 'lean production is used to improve product quality' (Yu, an operative in Auto-2). In addition, 'lean production enhances workers' motivation' (Xie, a team leader in Auto-4); 'lean production also promotes continuous improvement. It motivates workers to improve products and processes' (a production manager in Auto-3). In general, as Hua (who is a former director of a firm and a union chairman in the headquarters of SAIC) said, 'lean production is about leanness, with cutting costs being at its core'.

The above understandings are fundamental to the effective implementation of lean production. The adaptation of lean production in SOEs is of significance because waste has been one of the most stubborn and fatal problems in SOEs. Employees in the auto components companies have been instilled with a cost-based thinking way instead of the traditional one. In the planned economy when enterprises were under the protection of the government, a profit was certain, and higher costs simply resulted in higher prices. Enterprises reported costs and prices to the government without caring about high costs. However, it led to massive waste and low efficiency. The price formula is: Cost + Profit = Price. By contrast, in the market economy, low cost and good quality is a prerequisite for competitiveness because the cost is uncertain and customers insist on a competitive low price. This means that profits can only be made by reducing costs. The price formula is: Price – Cost = Profit, as a head of the manufacturing department in Auto-3 suggested:

Looking at these two formulas, conversion is not a simple mathematics game. It needs a fundamental change, which affects the company's fate. My job has shifted to tap the potentialities of my company development. For example, it is to keep as little cash as possible tied up in inventories and to increase cash flow.

Without a doubt, management's attempts to raise labour productivity and profitability constitute the dynamic behind the emulation of lean production. In SAIC, as will be discussed below, cutting costs runs through all the production process, with the reduction of work-in-progress inventories as the first step, the elimination of defective products as a focus and reducing the lead time as a driver. It seemed, on the face of it, that the primary goal of management was, as Kenney and Florida (1988: 136) claimed, 'to increase productivity not through super-exploitation of labour but rather through increased technological efficiency, heightened utilisation of equipment, minimal scrappage or rework, decreased inventory, and higher quality. It thus increases the "value" extracted in production, decreases material consumed per unit output, and minimises circulation time, making the actual production process much more efficient'. However, my research reveals that the implementation of lean production was inevitably implicated in the intensification of labour, the increase of stress and more management control.

5.2 Reduction of Work-in-Progress Inventories

In the lean supply chain, JIT is a key technique to reduce costs. JIT seeks to exactly match production to both internal and external customer demands. The exact quantity of the necessary materials for the production line are intended to arrive at

the time needed to ensure that the exact quantity of finished parts are dispatched to the customer on time for further productive consumption. JIT's most visible aspect is its very low use of inventories which improves stock-turns and ultimately capital turnover (Delbridge and Oliver, 1991). It is also observed that JIT is often transferred from the core manufacturing company throughout the supply chain (Oliver and Wilkinson, 1988; Oliver, 1991; Turnbull *et al.*, 1992).

In SAIC, SVW firstly announced it would apply JIT and demanded its component suppliers to deliver components on time. At the time the research was conducted, most local suppliers delivered every two days on average and did not approach the ideal of JIT production. SVW assembles a Santana car every two minutes on average, and a one hour delay in components delivery could, therefore, potentially affect the assembly of 30 cars. The component suppliers had responsibilities for delivery on time and paid for any costs due to delays. More exactly, SVW pushed the pressure down the supplier chain by shifting the burden of inventories onto them.

Auto-1 firstly dabbled with JIT in 1993. As a supplier of SVW, Auto-1 recognised JIT as not only providing customers with exactly what they want on time, but also ensuring that every production procedure was completed on time without unnecessary stoppage and work-in-progress inventories. In September 1993, director Chen decided to build up the JIT system in two and half years with a reduction of work-in-progress inventories in the first half of year.

In discussing JIT, reference has been made to a ship floating in deep water

(high inventories prior to JIT) that covers the rocks (waste and problems); then by gradually lowering work-in-progress (WIP) inventories, the rocks are exposed releasing improvement opportunities (through JIT). Auto-1 used craft production as a dominant mode of fabrication and assembly, and massive work-in-progress inventories hid problems by covering them up, as Wang described:

> There was a very small production line surrounded with a large amount of work-in-progress inventories. We also had materials inventories and finished goods inventories. Many problems were often hidden by these inventories, such as machine break-downs, worker absenteeism and poor quality of products. So maintenance, quality and management control were not considered important by managers and workers (a head of the production department in Auto-1).

As a consequence, it was a formidable task for management to build up a JIT production system that required zero inventories and broke up old production methods. Each revolution has a hurdle at the beginning, as Yu recalled:

> When I was told firstly to cut work-in-progress inventories, it almost killed me. How big a risk I will take if an operation is unbalanced and a machine breaks down! 'Headache' was a common feeling amongst middle managers like me. It would be unimaginable for me to manage without inventories (a production manager in the No.1 Workshop of Auto-1).

Pan believed that the reduction of work-in-progress inventories was also a challenge to workers because they would have to change their ways of doing things:

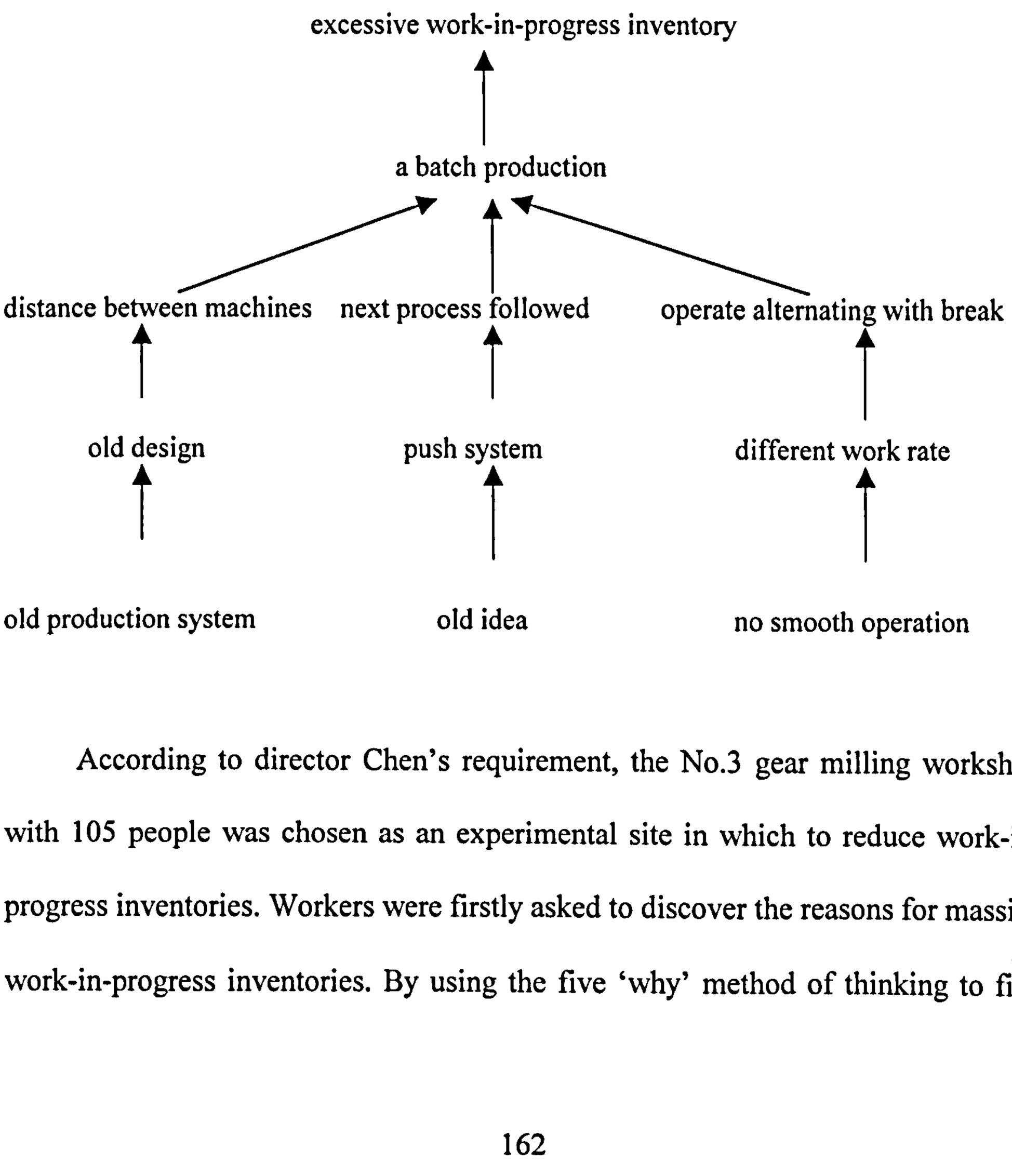
> For workers, it was convenient to pick up parts from boxes close to the machine. They used to fetch parts when they needed. Some workers who hid or threw defective products away could easily find parts to rework (the party

secretary in the No.1 Workshop of Auto-1).

When managers and workers were worried about the fluctuation of production, director Chen persisted in applying JIT production to reduce inventories and to find any problems hidden behind the inventory, as Wang recalled:

> To make middle managers understand, Chen led 28 middle managers to learn about lean production in ChangChun No.1 Auto Works in September 1993. Later, he invited some experts to give lectures, and he introduced lean production in the training courses by himself.

Figure 5.1 The Causes of Work-in-Progress Inventories.



According to director Chen's requirement, the No.3 gear milling workshop with 105 people was chosen as an experimental site in which to reduce work-in-progress inventories. Workers were firstly asked to discover the reasons for massive work-in-progress inventories. By using the five 'why' method of thinking to find

problems, they were able to produce some results, as shown in Figure 5.1. By spotting these problems, workers and management came to be aware of massive waste.

It is clear that senior management forced workers to reduce work-in-progress inventories. The inventory control was implicated in the whole production process. In essence, without the existence of buffer stocks, management gained greater control over both production and the workers. In the following sections, it will be seen how one-piece flow and the kanban system were implemented to reduce waste caused by work-in-progress inventories in SAIC. Cellular manufacturing and standardised operation will be considered in Chapter 6.

5.2.1 One-Piece Flow

One-piece flow is a core of JIT, and initially involves implementation of kanban, group technology (cellular layout) and the quick change of dies. Williams *et al.* have indicated that:

> Low stocks are an important indicator of the physical integration of manufacturing operations and measure the manufacturer's ability to realise smooth continuous flow in multi-process manufacturing; flow is an important influence on productivity and costs because smooth flow takes out indirect handing labour and allows direct labour to work continuously and efficiently (Williams *et al.*, 1992: 22; cited in Danford, 1996).

During my research, several shop floors had developed new layouts in an attempt to group operations around the product and to improve material flows. The

No.3 workshop in Auto-1 initially utilised one-piece flow. The engineers and production managers, as well as workers, designed a suspension conveyor belt of materials and work-in-progress goods. The automatic conveyor belts were used to reduce work-in-progress inventories. When I visited the shop floor, I wondered how the conveyor belt was designed because it was totally different from the old production line. Where did they get their ideas? Pan mentioned that learning and practice was the best way:

> We visited Changchun No.1 Auto Works to learn how to design conveyor belts because they copied a firm in Japan. At the same time, we read some books about JIT. Engineers, management and workers worked together to design flow devices and tested them. Finally, a rough model of an idealised production flow was established.

He continued to explain the features of one-piece flow:

> Firstly, one part (not a batch) is moved from one operation to the next as soon as it completes. Secondly, there is no place for extra work-in-progress inventories. The quantity of work-in-progress parts is not allowed to exceed the amount of loading in the previous working procedure. Finally, it is useful to improve product quality because only those goods that meet a certain standard can flow to the next procedure.

From 1994, other enterprises applied one-piece flow one after another. The technique almost copied what Western companies did. In Auto-4, Xue told how an American expert was surprised by the one-piece flow there:

> One day, when an American expert was visiting my workshop, he asked me: 'are you applying lean production? Has anybody been to an American firm? How did you know about setting up one-piece flow?' I told him that the one-

piece flow device was designed by my co-workers and engineers who have not been to any American firm (in the No.1 workshop of a firm).

As another example, several professors from the university were invited by Auto-6 to rearrange the shop floor layout in order to form a flow. In 1995, one-piece flow was adopted in one workshop in Auto-7, Auto-8 and Auto-9. In Auto-3, three suspended cycle conveyor chains were set up. As a result, they moved 100 toolboxes, saved labour and reduced work-in-progress inventories from 5,000 items to 2,000. In Auto-5, a production manager in the gear workshop firstly set up one-piece flow in February 1995. The experiment with one-piece flow was successful there. The work-in-progress inventories dropped two months later. They then built up 16 production lines in the whole workshop in May 1995. The results shown in Table 5.1 were also demonstrating to management and workers that waste was reducible and higher productivity levels were achievable. My survey shows that 83% of workers had experienced one-piece flow. It demonstrated that a rudimentary frame of flow management has been formed in SAIC.

Table 5.1 Changes after Adopting One-Piece Flow in Auto-5.

	Before adopting flow (1995 Jan)	After adopting flow (1995 Nov)
Output monthly	2,840,000	3,460,000
WIP parts	3,840,000	2,080,000
Work rate	30 %	50%
Workers		Reduced 4 people
Lead time	45 days	20 days
Spot and environment	Disorderly and dirty	Orderly and clean

Some enterprises successfully choose one-piece flow as a breakthrough point because it is a technique that is relative easily learned. The results in terms of reduced work-in-progress inventories and waste were directly perceived in a short time. When I asked managers about their interpretation of the success of one-piece flow, I found their reaction to be, in the main, highly positive. Managerial satisfaction was understandable because their underlying interpretation was that higher profits would not have been achieved if one-piece flow had not been introduced, as production manager Wang in Auto-1 put it:

> If I refer to a production line as a running river, then the parts flowing on the river neither dried up nor overflowed, this makes the operatives add value without stopping. All off-line people including maintenance workers and engineers have to serve the first line workers who create value directly by keeping every machine running smoothly. Operational efficiency has also improved since first line workers operated more than two machines instead of a single one, and standardised operations were applied.

Another reason for management being increasingly keen to use one-piece flow was to exert tighter control over workers. Production manager Ru revealed his feelings:

> The production lines were stopped frequently because of incidents including machine break downs, shortages of material and tool breakages. Due to the existence of the safety inventory, workers were not motivated to discover problems. After applying one-piece flow, incidents dropped because operatives must follow the regulations strictly. There are rules involved in production, maintenance, material supply and so on. We just check to see if they obey the rules and no longer talk too much about them (Auto-3).

A manager in Auto-2 had the same feelings:

In the earlier days, workers could choose their own break times. So there were always people walking around to take a cup of tea and chatting in the sitting room. Now, one-piece flow can readjust the continuity of production and balance outputs, operatives work on the production line with the same time to commence and stop to sit idle when the bell rings. This is a new kind of surveillance.

On this point, Danford has observed during his research at Japanese transplants in Wales that, 'the opening objective of the company's bell to bell system was to remove these longer discretionary breaks'; then 'squeeze these little portions of time by forcing the operators into a state of ennui for which more production work was the only remedy' (Danford, 1999: 117). He went on to point out, 'the reduction of "human waste" and "idle time" amounted to growing fatigue; working without breaks; working under constant surveillance.....'(Danford, 1999: 120).

At this stage, workers' attitudes to one-piece flow were mixed. On the one hand, workers realised that reduction of waste would improve productivity. Yu, a team leader in Auto-4 expressed his personal experiences:

> To be frank, I did not understand JIT the first time I heard of it. Usually, I produced extra components to be used the next month. Why should we apply JIT? I fulfilled the production targets, didn't I? Later, I came to understand what managers said. People were needed to transport and look after extra components. This is waste. In carrying out JIT, lots of money can be saved.

On the other hand, workers complained that the production controls had obviously become tighter and they worked harder than ever before. Xue in Auto-4 gave his

opinion:

> One-piece flow looks like management control over parts or materials, it really is a control over people. You see, if an operative does not conform to discipline strictly, the flow will not be formed.

A worker in Auto-3 spoke forthrightly:

> We have been tied directly to the production flow since flow-oriented production replaced the old production methods. You see, how difficult it was for me to handle several machines with their different processes and to keep production to run smoothly, how much pressure I suffered because I had to anticipate problems before they became serious enough to stop everything. The further speed-up of the assembly line made me exhausted.

The management's efforts to maximise returns on investment collided with efforts to maximise workers' rights. The impact of JIT on workers will be discussed in the next chapter in some detail.

5.2.2 Pull System and Kanban

Schonberger (1982), Hall (1984), Sage (1984), and Heard (1986) all state that in a pull production system, the subsequent process draws the parts from the preceding process, it is also one of the requirements of JIT since only the final assembly line can accurately demand the necessary timing and quantity of parts required. Pull production is a consumer-initiated system rather than a forecast-initiated system. Management in the component supply companies tried to establish a pull production system. They made plans according to the requirements of the Santana

car and delivered components on time. Management in Auto-1 realised that the pull system would be useful to reduce work-in-progress inventories and improve managerial knowledge. During my research in Auto-1, a manager showed me a table, which was a comparison of a push system and a pull system (Table 5.2).

Table 5.2 Pull System versus Push System.

Terms	Push system	Pull system
Responsibility	Dispatchers	First line operatives
Control of flow	To meet standards	Continuously
Dispatch	According to progress	Visible, follow customer
Inventory	No limit	Limit to minimum
Problem of production	May hide	Expose and resolve
Communication	Occasionally	When needed
Response time	Changed by control system	Just-in-time
Visible sign of problems	Inventory	Stop
Material control	Record out and in material	Automatic

Kanban is at the heart of JIT or lean production because it is the chief mechanism for allowing the pull system as well as making schedules visible. Kanban is a card or other device that serves as a visual signal to control the flow and production of materials. It is also used for drawing materials or making a production order. The final process uses kanban to pull needed parts from the previous process, which pulls from the process before it, and so on. One-piece flow makes intensive use of kanban signals. The kanban system is useful to eliminate waste caused by excessive work-in-progress inventories.

All sample enterprises in SAIC applied the kanban system including

production kanban and material kanban. The deepest impression of mine was an electronic kanban in Auto-2. A big screen--an electronic production kanban--was set up in a central position on the shop floor to show production information. A computer system was used to control the kanban system.

Figure 5.2 One Kind of Production Kanban in Auto-2.

The Santana Front Damper Structure Module
Planned quantity: 5,400 units Date: 11 July 1999
Completion quantity: 3,980 units Time: 12:12pm

Figure 5.2 shows one kind of production kanban, which presents completion against the target. A worker told me that according to the above kanban, this shop floor should produce 5,400 damper structure modules this day. By 12:12pm, they had completed 3,980 units. Before the end of work time 3:30pm, they needed to complete 1,420 units and would be not allowed to produce more than that. It seemed that workers had got to know about kanban.

However, it was difficult for workers and managers to use kanban in the first stage of adopting lean production. Some workers disliked picking up material cards whilst some workers did not know what to do with the cards. The production manager Yu recalled:

Workers used to be given assignments by dispatchers. They doubted the necessity to use a kanban. One worker argued that he did not use kanban but the production line still kept running to fulfil monthly targets. I also believed it was unnecessary at the beginning. When a top manager asked to set up kanban, I did not take it seriously (Auto-1).

It was certain that kanban did not work well at that time because a few workers did not comply with the rules and a few managers did not supervise them. However, things have changed since an incident happened in SVW. The head of a SVW firm Yu, whom I interviewed, told me about the incident:

> A worker who delivers materials should pick up a kanban card each time. However, he took ten kanban cards together after he delivered ten times. The reason was simple because he did not believe there was any difference. Unfortunately, this was discovered by a manager. The worker was punished and almost lost his job. All employees in SAIC were shocked by this incident.

He continued to point out:

> Indeed, managers are key figures in the application of the kanban system. They should implement stringent criteria without any exceptions. Managers in our firm carried on strict management due to the pressures that came from our foreign partner. I believe managers in SOEs had the same pressures, but they came from the cruel market competition.

Since then, senior management had tried to build a harsh disciplinary regime and asked management at all levels to repeatedly check the production process in order to change old operation habits. The process of implementing kanban was implicated with the assertion of management prerogative. Management had power to take disciplinary action against individuals who failed to conform to what

management said. So management enjoyed the benefit from using kanban, a manger in the production department of Auto-3 said:

> Waste caused big loss. You see, some workers drew double the amount of materials for producing 10,000 spring units. Later it was difficult to know where surplus materials had gone.
>
> By using kanban, workers drew materials in the exact amounts required. Of course, it was impossible to work well the first time. We gradually reduced material supplies. For example, if we produced 10,000 spring units in one month, we reduced materials supplies from the previous 20,000 units to 15,000 units then finally 13,000 units.

Similar results occurred in the other firms. By using kanban, for instance, the work-in-progress inventories of one production in Auto-2 had dropped from 18,000 to 5,000 between 1994 and 1995. Auto-9 saved RMB 1 million on a shop floor in 1996. Auto-1 saved interest on loans of RMB 5 million on average in 1996 and saved inventory capital RMB 5.4 million in 1997. Auto-5 reduced RMB 15 million the costs of work-in-progress and warehouses in 1999. At the time of the interviews, I inquired about the extent to which kanban had been adopted. A manager in the production department in Auto-2 commented:

> Having used kanban for five years, we made progress. But some workers occasionally do not follow the rules of kanban, and we need to check and to correct it. Of course, we need not to repeat what we did at the beginning. Kanban management is set up as an important assessment standard. Workers are used to it now although it takes time.

On the other hand, a manager was candid in his statement that kanban was not feasible in some firms:

> I believe kanban is at the highest level of lean production. It has three prerequisites including the smoothing of production, the layout of the process, and standardised jobs. But we have not ensured a smooth flow of materials and a balanced production process. In fact, pure kanban management is now a rarity in our firm. It is unworkable although it can eliminate waste.

Similarly, zero inventories are a goal that can never be attained. In fact, every enterprise still keeps some inventories. A manager in Auto-3 said:

> It is impossible to eliminate work-in-progress inventories. I am worried about variability. I mean, machines may break down, some equipment takes about two days to set up and special raw materials or parts cannot be delivered on time. Only those enterprises in SAIC or in linked industries use JIT delivering raw materials or parts exactly at the time we need. Considering these factors, we have to keep some inventories in order to supply SVW on time. Some firms have temporary warehouses near SVW.

The introduction of kanban has changed workers' behaviour. On the other hand, whilst the waste reduction was achieved by implementing kanban, a question arises: who were the prime beneficiaries? In fact, workers felt they had been treated unfairly. They did not get a fair reward either in respect to their hard work or with respect to the high profits the company had gained. The subject of worker's pay will be analysed in Chapter 8.

5.3 Elimination of Defective Products

5.3.1 New Emphasis on Quality Control

Quality control has been a central theme in enterprise management in SOEs. Management in SOEs initially implemented TQM and QCs in the 80s, but they had

a long way to go. A top manager in SAIC indicated the importance of improving product quality:

> We have been focused on quality management for 12 years. In my opinion, everything will be fine if we improve quality. By contrast, if the product is of poor quality, the company can go out of business. The top priority of our company is quality.

Quality control is a cornerstone of JIT since the continuous flow of production would be impossible without quality control. Whilst SVW implemented JIT, it pushed responsibility for quality control down the line to suppliers. Quality concerns were of increasing importance in determining the nature of buyer-supplier relationships. Any components which did not meet SVW standard would be rejected or, where they needed to be re-worked, this caused large amounts of waste.

The firms I visited were building an environment of higher quality under the lean production system. When I entered the main entrance of Auto-1, I was attracted by a slogan 'the principles of product quality'; 'our image is quality, speed with quality; cornering the market with quality; making profit by quality'. In Auto-2, the eye-catching poster stated that: 'Quality is the first target'. In SAIC, managers and workers came to realise that quality management under lean production was a totally new idea:

> In a planned economy, quality standards were set by the state rather than customers. Now, zero defects are a basic expectation of our customers. One defect may ruin a company's reputation and also causes waste (Shen, a supervisor in Auto-3).

Workers were satisfied with a 1% defect rate. Now, we are trying to limit the defect rate to 0.01% although it is difficult to have zero defects. We gave up the old audit unit and adopted a defect measuring unit of one million units, namely, PPM (Wang, a manager in Auto-1).

In the past, there were always extra parts available if one made a defective product. Now, few work-in-progress inventories can be used to replace defects that are 'inspected out'. The production line will stop when a defective part is found, which is known by everyone on the shop floor (Zhao, an operative in Auto-2).

Before adopting lean production, quality control activities were largely a matter of rigorous inspection carried out by specialised inspectors in a specific area. Now, each operative is required to do it right the first time and to catch errors before they become defects on the production line. Each product is water tested for leaks (Qiu, a team leader in Auto-6).

A number of quality management activities were carried out in SAIC, such as adopting international quality standard systems and zero defects systems. The zero defects system, a main activity of team working will be examined in Chapter 7. Under lean production, every operative has the responsibility for the quality of products that he or she is making, which increased workers' stress levels, and this will be analysed in Chapter 6. The adoption of international quality standards is discussed below.

5.3.2 Quality Standards System

Conforming to international quality standards is a key step to quality control because it ensures that a firm has an adequate process to protect it from poor quality and avoid producing defects by inadequate operations.

What were the imperatives to implement new quality standards? Before 1990, there was only a very simple quality standard that did not meet international quality standards. In order to produce the components of the Santana car, the components enterprises in SAIC had to achieve the quality standard set by GVW. At that time, several operating parameters were standardised across all Volkswagen groups world-wide. At first, SAIC faced a tough problem. A worker in Auto-2 told me his story:

> We tried to manufacture a suspension welding assembly, which was new to me and the engineers. After many trials, we failed to meet the quality requirements because the length of a welding point was too short. So our products were rejected. We expected the quality standard could be altered. But, the Germans insisted on the standard.
>
> The only thing we could do was to work up to this standard. It was a hard struggle. Top management invited specialists from GVW to give technological support in addition to importing some key equipment for welding. Engineers and workers made periodical visits to Germany for training in technology. Later, we were successful in matching the standards. You see, the customer's standard was a unique standard, it was rigid.

Like Auto-2, all SVW suppliers had to meet quality standards set by GVW. Things were different from previous years, when almost anything could be passed as acceptable quality. It was impossible to negotiate with the Germans. Even if a few quality targets were harsh, suppliers had to obey the standards. Otherwise, they would lose the opportunity to supply SVW. Engineers worked hard to overcome the difficulties and to make progresses.

After the implementation of lean production, top management in SAIC set a

goal to gain ISO9002 qualification and evolved a supplier evaluation system which involved a much more detailed supplier audit. ISO9002 is a quality standard for manufacturing processes being established by the International Standards Organisation. Quality is seen as being a result of all the operations of the enterprise and the certificate of ISO9002 is a passport to international markets.

The first leading group to monitor ISO9002 adoption was set up in Auto-1 in January 1994, with director Chen being the group leader. The ISO9002 quality standard started to be formulated in May 1994. A quality standard system was developed with 20 programme files and a quality guarantee manual after investigation, test and modification four months later. All operation processes were documented in much more detail. Furthermore, training was carried out as the driving force for stepwise achievement. 1,800 workers were trained. After strict assessments, Auto-1 got a GB/T19002-ISO9002 system certification in December 1994 and SB/T19001 and ISO9001 one year later. All enterprises in SAIC were certified ISO9000 series users by the end of 1998.

The degree to which international quality standards are adopted is associated with continuous improvement. As a further development, Auto-1 and Auto-2 aspired to the VDA awarded by the Germany Automobile Association and QS9000 awarded by three American automobile companies. In 1996, Auto-1 was assessed as an 'A' level component enterprise by GVW and passed the approval of VDA 6.1, with QS9000 being awarded in July 1999. It meant that their product gear assembly line could participate in international group supply without any limitation.

There is evidence that these improvements can be credited to the application of lean production. When I enquired about the biggest change in the enterprises since lean production was implemented, the answer was the improvement of product quality, as Xie put it:

> Lean production makes each individual responsible for what they produced. We do not have quality inspectors now. Every operative checks quality during the production process. The defective product rate has dropped dramatically. Otherwise, returned defective products will cause economic losses. We really benefit from lean production (a team leader in Auto-4).

Chen emphasised the shift in workers' ideas:

> My job has been control of product quality. In the past, some workers ignored any quality inspections. Due to the pressure of competition, workers come to regain the initiative. They would like to ensure that all the jobs they did matched the quality standard. They enjoy being representatives of an enterprise committed to making products that satisfied customers' needs (a manager in the production department of Auto-4).

Each department participated in quality control. Quality analysis at the product development and product design stages, for example, are essential to establishing overall product quality, since it is impossible to correct errors made at either stage once the product reaches manufacturing and inspection departments. The Santana cars were bought by 40% of SAIC employees by 2000. They had confidence in purchasing these cars because they trusted the cars' quality. However, there is an uneven and partial conformity to supplier quality evaluation systems amongst components enterprises, zero defects are still a utopian ideal despite considerable efforts in SAIC. Obviously, the management has passed the pressure

of quality control to workers. It becomes clear that the new relationships in fact bear distinct similarities to the management-by-stress inherent in JIT labour relations (Rainnie, 1991: 356; Parker and Slaughter, 1995).

5.4 Shortening of Lead Time

Lead time is the time interval from production dispatching to delivery of completed products. The JIT system aims at shortening lead time to reduce waste because it gives the enterprise an earlier return on its investment of resources in the product. It is evident from the company goals that the emphasis on lead time reduction is not just a function of improving capacities of delivery speed, but is also the general driving force for improving customer satisfaction (responsiveness), quality and delivery performance in general (Lindberg, 1998: 263).

In SAIC, the most significant driving force has been the reduction of lead time. The reasons for selecting lead time as the driving force for change are several. First, time is easy to grasp, since it is a clearly defined concept known to everyone. Secondly, it is relatively easy to measure levels of performance. Thirdly, there is a clear inter-dependency between time factors and quality issues and/or cost issues.

One pioneering enterprise in this respect is Auto-1 which initially used a sophisticated computerised technique--MRPΠ (manufacturing resource planning) to shorten lead time in 1995. MRPΠ offers information on how to monitor material flows and cash flows and makes it possible to put the required amount of products

in the required place at the required time. Auto-1 bought 16 modules from America. MRPΠ was intensively used in inventory management, production management and financial management. Auto-1 started to implement 'weekly planning' in 1997. The 'weekly planning' determined the planning period for a week instead of a month. When an unpredictable and varying schedule from customers was identified quickly, the previous planning of inventories could be quickly adjusted. The reduced plan period was consistent with the reduction of inventories. The production manager Wang introduced the implementation of 'weekly planning':

> 'Weekly planning' rotated planning on a weekly cycle instead of a monthly one. This made it possible to modify quickly to balance each process. Large waiting times were quite usual due to the shortages of materials and parts. Sometimes materials were lacking; at other times there was a surplus. After using 'weekly planning', workers put data about the production process in to the computer at 9:00am. An electronic kanban shows all material needs and processes of operations before 1:00pm.

Weekly planning also changed delivery times which were faster than before. According to the plan, raw materials were delivered directly to the shop-floor and finished components were sent directly to the assembly line. External component suppliers built warehouses near our enterprise and offered components to the assembly line on every shift. The cycle time for producing a Santana car decreased from 60 days in 1994 to 30 days in 1998.

Auto-2 also claimed it had used MRPΠ. It should be noted that there are only a few enterprises that can afford a full-blown MRP and MRPΠ. The other firms in which I conducted research did not use MRPΠ.

How had all of this impacted upon workers? With the effort of cutting down

lead time or inadequate customer orders, the unnecessary manufacturing days were reduced according to the plan. Workers were utilised so as to maintain equipment or to have days-off without pay to save costs for energy such as water, electronics and labour costs. Workers have to be amenable to this change. In Auto-2, a worker talked about his feelings:

> I used to work every working day. I did not believe that I must stay at home some days with reduced salary. Now I have changed my old ideas and adopt a new one that the first priority is for our enterprise to save costs. It is common sense to save costs by shutting down machines, switching off the lights and the like.

5.5 Summary

This chapter began by presenting management and workers' views on the roles of lean production. It went on to explore the process of the implementation of lean production. It was seen that great attention has been paid to the elimination of waste by reducing work-in-progress inventories, dropping defective products and shortening lead time.

My research suggests that component supplies in SAIC has been undergoing some radical changes in order to adopt lean production practices. Management, under the pressure from the customer SVW, has implemented lean production and just-in-time techniques, such as one-piece flow, kanban and quality control. However, the degree of application of the new techniques in different components enterprises varied greatly, and the process of implementation was slow and steady.

GVW, the German partner of SVW, plays an important role in imposing these changes. GVW adopts stringent quality management criteria, which often is associated with the presence of new management style, across all Volkswagen Groups world-wide and pushes responsibility for quality control down the line to suppliers. Any components which do not meet GVW standards will be rejected. For suppliers, the re-work will cause large amounts of waste and they will even be in danger of losing opportunities to supply SVW. GVW has provided training, advice and technology for local components companies to march the required standards and to improve levels of management competency.

Sayer (1986), Turnbull (1988), and Tomany (1990) have argued that functional flexibility and the reduction of buffer stocks associated with the JIT regime is, in essence, the means for the intensification of work. Danford notes that 'the process of stock and buffer reduction had clear implications for the intensification of labour, for the worker's capacity to take an unofficial breather' (Danford, 1996: 177). We have seen at the components companies in SAIC that the processes of implementation implied the exercise of management prerogative and the building of a harsh disciplinary regime. Management has increased control over the production process because their aims are not only to reduce inventories but also to eliminate labour by closing up the porosity of the working day. In this respect, this chapter therefore lays the foundations to further explore, in the following chapters, how lean production made workers work harder, how work became more stressful and how it influenced work organisation and the role of the trade unions.

Chapter Six

Intensification of Labour under Lean Production Control

The foregoing chapter has examined how management in the auto components companies of SAIC applied lean production control in the labour process, aimed at eliminating all human and material waste by slashing inventories, cutting down on the number of defective products and efficiently utilising labour. In this chapter, I explore the impact of lean production control on workers.

The impact of lean production on workers in the West is a controversial issue. There are at least two divergent views on it so far. Womack and his fellow researchers (1990: 14) think that lean production can give workers the 'freedom to control their work' which is in contrast to the 'mind-numbing stress' of mass production. They claim that lean production uses 'half the human effort in the factory' as compared with traditional mass production (Womack *et al.*, 1990: 13). However, other researchers argue that lean production obligates workers to intensified labour through 'management by stress' (Parker and Slaughter, 1995: 41). Babson (1995: 31) criticises that lean production cuts personnel to the minimum and forces the remaining workforce to do more work. Rinehart *et al.* (1997: 83) also charge that employees have too much work to do because of understaffing.

Based on interviews and questionnaire-based survey data collected from the components companies in SAIC, this research illustrates that lean production heightens work intensity and stress in Chinese auto components manufacturing

firms, and it shows how management uses lean production techniques in labour utilisation to control the work pace. The analysis discloses the reasons why workers accept intensified work, and explores the impact of lean production control on workers' health and safety.

6.1 Survey and Findings

6.1.1 Perceptions of Work Intensity and Work-related Stress

To measure employee perceptions of work intensity and work-related stress, they were asked to respond to three statements: (1) my job made me work very hard; (2) I never seem to have enough time to get my job done; (3) I worry a lot about my work outside working hours. The first two items are more to do with work intensity, the third is more to do with work-related stress. Tables 6.1a-c list the frequencies of workers' answers.

It is a fact that more than two-thirds of workers reported that their jobs made them work very hard. Regarding job categories, 65% of direct production workers, 76% of maintenance workers and 82% of group leaders agreed or strongly agreed with the statement. Furthermore, about one quarter of workers thought they never seemed to have enough time to get their work done (27% of direct production workers, 20% of maintenance workers and 25% of group leaders). In addition, two-fifths of workers worried a lot about their work outside working hours (41% of direct production workers, 37% of maintenance workers and 46% group leaders).

Table 6.1a Responses to 'My Job Made Me Work Very Hard' by Job Category.

	Production workers N (%)	Maintenance workers N (%)	Group leaders N (%)	Total N (%)
Strongly agree	55 (13%)	6 (12%)	11 (27%)	72 (14%)
Agree	216 (52%)	32 (64%)	22 (55%)	270 (54%)
Neutral	105 (26%)	7 (14%)	6 (15%)	118 (23%)
Disagree	33 (8%)	5 (10%)	1 (3%)	39 (8%)
Strongly disagree	4 (1%)	0	0	4 (1%)
Total N (%)	413 (100%)	50 (100%)	40 (100%)	503 (100%)

Table 6.1b Responses to 'I Never Seem to Have Enough Time to Get My Job Done' by Job Category.

	Production workers N (%)	Maintenance workers N (%)	Group leaders N (%)	Total N (%)
Strongly agree	19 (5%)	0	2 (6%)	21 (4%)
Agree	88 (22%)	10 (20%)	7 (19%)	105 (22%)
Neutral	116 (29%)	12 (25%)	8 (22%)	136 (28%)
Disagree	149 (38%)	25 (51%)	15 (42%)	189 (40%)
Strongly disagree	23 (6%)	2 (4%)	4 (11%)	29 (6%)
Total N (%)	395 (100%)	49 (100%)	36 (100%)	480 (100%)

Table 6.1c Responses to 'I Worry a Lot about My Work outside Working Hours' by Job Category.

	Production workers N (%)	Maintenance workers N (%)	Group leaders N (%)	Total N (%)
Strongly agree	28 (7%)	1 (2%)	3 (9%)	32 (7%)
Agree	134 (34%)	17 (35%)	13 (37%)	164 (34%)
Neutral	120 (30%)	18 (38%)	7 (20%)	145 (30%)
Disagree	105 (27%)	12 (25%)	11 (31%)	128 (27%)
Strongly disagree	8 (2%)	0	1 (3%)	9 (2%)
Total N (%)	395 (100%)	48 (100%)	35 (100%)	478 (100%)

From Table 6.2, it is can be seen that work intensity in SAIC may be slightly lower than that of manufacturing operatives in Britain and several firms in the white goods, car and textiles industries in Turkey. 72% of UK operative and 74% Turkish workers felt that their job required them to work very hard, compared to 68% of workers in China; 34% of UK workers and 41% Turkish workers thought that they never had enough time to get their job done (26% workers in China). However, workers in China were considerably more likely to be worried about their work outside working hours than UK operatives (41% against 20%), and slightly less likely to be experience work-related stress than Turkish workers (48%).

Table 6.2 Comparison of Workers' Views on Work Intensity and Work Related Stress in China, Turkey and UK.

Agree and strong agree	China	Turkey	UK
My job made me work very hard	281	256	4,230
	(68%)	(74%)	(72%)
I never seem to have enough time to get my job done	103	142	2,156
	(26%)	(41%)	(34%)
I worry a lot about my work outside working hours	162	166	1,271
	(41%)	(48%)	(20%)

Source: WERS, 1998; Nichols *et al.*, 2002, working paper.

In SAIC, as shown in Tables 6.1a-c, the perceptions on work intensity and stress levels vary according to job category, ranging from 65% to 82%. Does this mean that the real workload of direct production workers is lower than that of maintenance workers or group leaders? The answer is not very straightforward. Age patterns are different in the three job categories of the surveyed workers. Besides the most important factor of workload, age also has a significant influence over workers' perceptions of work intensity and stress. Looking at production workers,

their statement of 'my job made me work hard' has clear age-related differences (see Table 6.3).

Table 6.3 Production Workers' Views on 'My Job Made Me Work Very Hard' by Age Group.

	<31		31--40		>40	
	N	(%)	N	(%)	N	(%)
Agree	86	(51%)	68	(74%)	108	(78%)
Neutral	59	(35%)	20	(22%)	21	(15%)
Disagree	23	(14%)	4	(4%)	9	(7%)
Total	168	(100%)	92	(100%)	138	(100%)

Table 6.3 shows that only 51% of production workers aged under 31 agreed with the first statement. This may be the reason why the percentage of production workers reporting their job made them work hard is lower than maintenance workers and group leaders. The figures may not reflect the real workload, but the perception. That is, young production workers may bear a workload as heavy as or even heavier than elder workers, but good health and the strong capacity in body recovery of younger workers enable them to feel better than the old workers. So the statistical results listed in Table 6.1a, hardly lead to the conclusion that the production workers bear less heavy workload than the maintenance workers and group leaders.

Taking jobs as a whole, Tables 6.4a-c display the responses of workers in different age groups in SAIC to the three statements, respectively, which are heavily weighted by the production workers accounting for 82% of the total surveyed workforce. The proportion of workers who agreed or strongly agreed with the

statements increases significantly with age. Looking firstly at answers to the first statement, the workers who felt that their job made them work very hard amount to 55% for those aged under 31, 69% for those between 31 and 40, and 79% for those over 40. Similarly for the second statement, those who thought they never seemed to have enough time to get their work done account for 16% (under 31), 26% (31--40) and 37% (over 40), respectively. As for those who worried a lot about their work outside working hours, 33% of the youngest group indicated this, as did 41% of the middle age group and 49% of the oldest age group. Therefore, it is very clear that, besides the workload itself, the age factor should be taken into account.

Table 6.4a Responses to 'My Job Made Me Work Very Hard' by Age Group.

Age (years)	<31		31--40		>40		Total	
	N	(%)	N	(%)	N	(%)	N	(%)
Strongly agree	18	(9%)	20	(16%)	34	(17%)	72	(14%)
Agree	90	(46%)	67	(53%)	124	(62%)	281	(54%)
Neutral	66	(33%)	31	(25%)	30	(15%)	127	(24%)
Disagree	20	(10%)	7	(6%)	11	(5%)	38	(7%)
Strongly disagree	4	(2%)		0	1	(1%)	5	(1%)
Total N (%)	198	(100)	125	(100%)	200	(100%)	523	(100%)

Table 6.4b Responses to 'I Never Seem to Have Enough Time to Get My Job Done' by Age Group.

Age (years)	<31		31--40		>40		Total	
	N	(%)	N	(%)	N	(%)	N	(%)
Strongly agree	6	(3%)	7	(6%)	7	(4%)	20	(4%)
Agree	25	(13%)	24	(20%)	61	(33%)	110	(22%)
Neutral	63	(32%)	31	(27%)	48	(26%)	142	(28%)
Disagree	89	(45%)	51	(43%)	58	(32%)	198	(40%)
Strongly disagree	14	(7%)	5	(4%)	10	(5%)	29	(6%)
Total N (%)	197	(100%)	118	(100%)	184	(100%)	499	(100%)

Table 6.4c Responses to 'I Worry a Lot about My Work outside Working Hours' by Age Group.

Age (years)	<31		31--40		>40		Total	
	N	(%)	N	(%)	N	(%)	N	(%)
Strongly agree	10	(5%)	8	(7%)	10	(5%)	28	(6%)
Agree	54	(28%)	39	(34%)	80	(44%)	173	(35%)
Neutral	64	(33%)	39	(34%)	49	(27%)	152	(31%)
Disagree	64	(33%)	28	(24%)	39	(21%)	131	(26%)
Strongly disagree	4	(2%)	1	(1%)	5	(3%)	10	(2%)
Total N (%)	196	(100%)	115	(100%)	183	(100%)	494	(100%)

Table 6.5a Responses to 'My Job Made Me Work Very Hard' by Gender.

Gender	Male		Female		Total	
	N	(%)	N	(%)	N	(%)
Strongly agree	47	(13%)	26	(15%)	73	(14%)
Agree	192	(55%)	91	(50%)	283	(53%)
Neutral	86	(24%)	47	(26%)	133	(25%)
Disagree	24	(7%)	15	(8%)	39	(7%)
Strongly disagree	4	(1%)	2	(1%)	6	(1%)
Total N (%)	353	(100%)	181	(100%)	534	(100%)

Table 6.5b Responses to 'I Never Seem to Have Enough Time to Get My Job Done' by Gender.

Gender	Male		Female		Total	
	N	(%)	N	(%)	N	(%)
Strongly agree	15	(4%)	6	(4%)	21	(4%)
Agree	78	(23%)	33	(19%)	111	(22%)
Neutral	107	(32%)	40	(23%)	147	(29%)
Disagree	118	(35%)	82	(48%)	200	(39%)
Strongly disagree	20	(6%)	10	(6%)	30	(6%)
Total N (%)	338	(100%)	171	(100%)	509	(100%)

Table 6.5c Responses to 'I Worry a Lot about My Work outside Working Hours' by Gender.

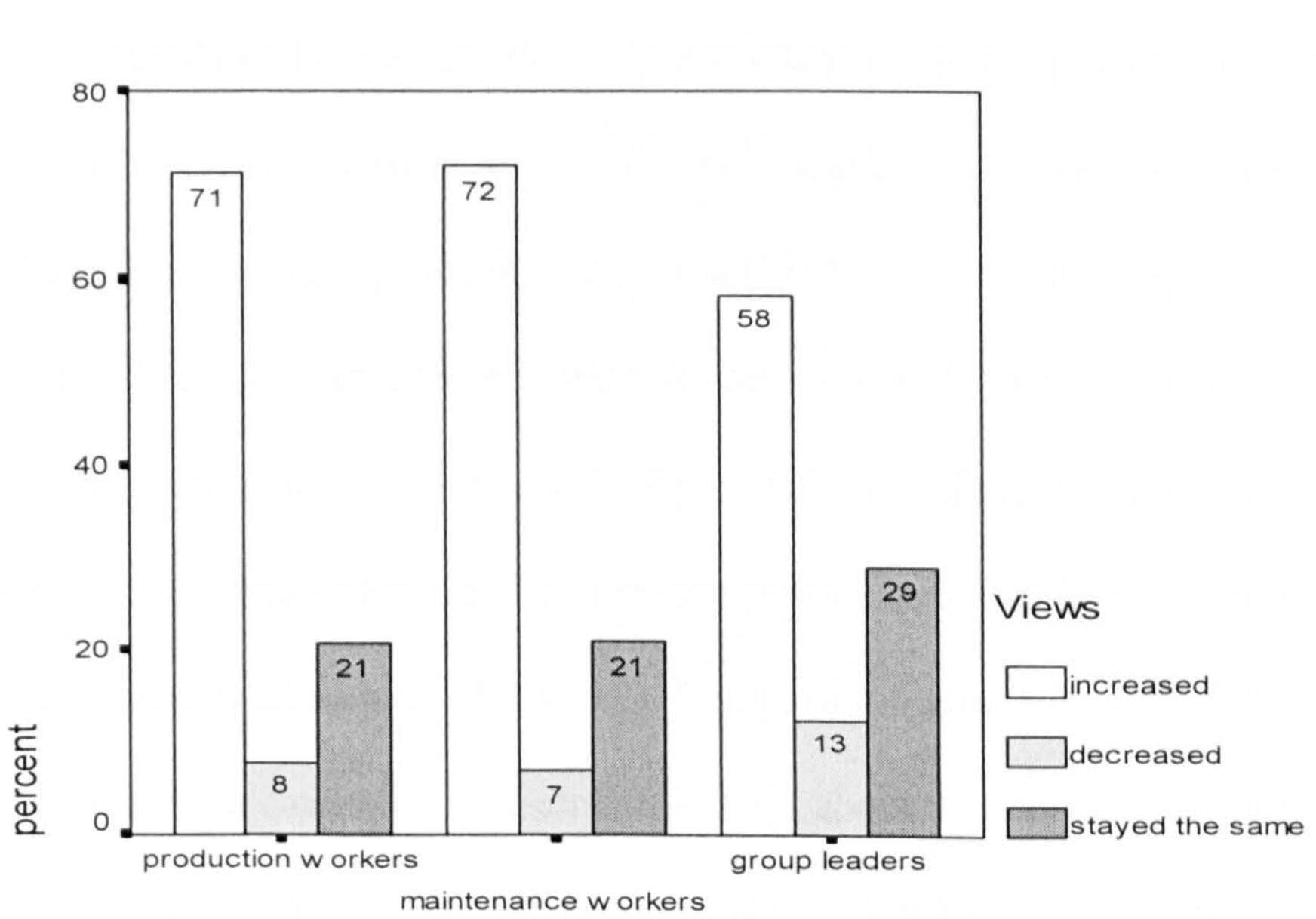
Gender	Male		Female		Total	
	N	(%)	N	(%)	N	(%)
Strongly agree	22	(7%)	10	(6%)	32	(6%)
Agree	128	(38%)	47	(28%)	175	(35%)
Neutral	99	(29%)	56	(33%)	155	(31%)
Disagree	81	(24%)	52	(31%)	133	(26%)
Strongly disagree	7	(2%)	3	(2%)	10	(2%)
Total N (%)	337	(100%)	168	(100%)	505	(100%)

The proportions of men who agreed with the statements about work intensity were slightly higher than that of corresponding women (Tables 6.5a and b), whilst the proportions of men who agreed with the statements about work-related stress were overtly higher than that of corresponding women (Table 6.5c). This is different from the survey results obtained in UK, where women (in all industries) were more likely than men doing similar hours to agree that their jobs were intense and stressful (Cully *et al.*, 1999: 172). In SAIC, both men and women were full time employees and their age patterns were almost the same. The lower perceived stress and job intensity of the Chinese females might be speculated to be the result of greater care given to them by management in Chinese companies by arranging for them to do easier work, changing their jobs to light ones when they get older and pressuring them less hard. In contrast to Western families, Chinese couples normally share the burden of housework and look after their children together.

6.1.2 Changes of Workload and Work-Related Stress

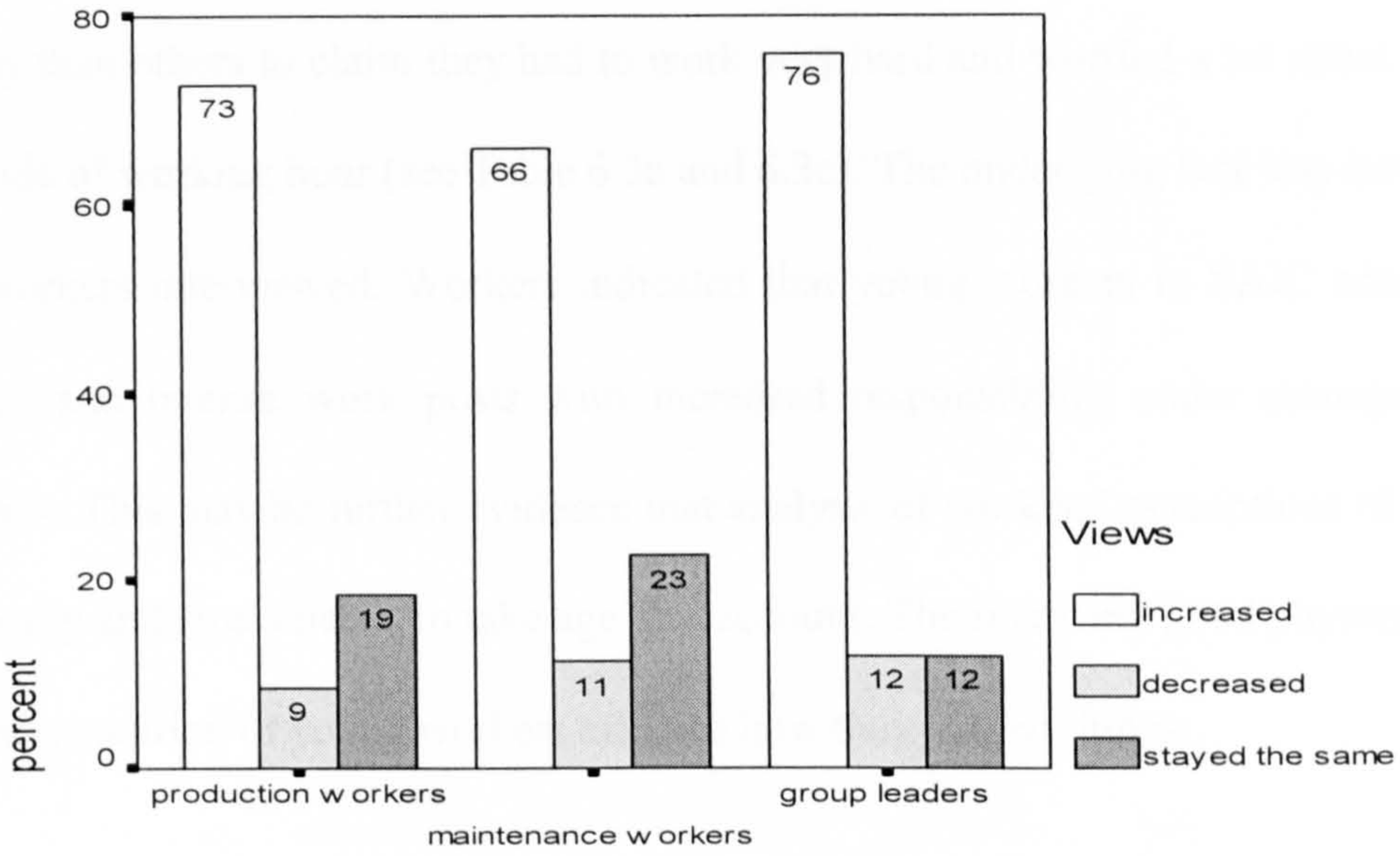
In order to measure the changes in work intensity and work-related stress due to the introduction of lean production control, workers were asked two questions: 'Has lean production increased your workload'?; 'Does lean production control increase your work-related stress'? Figures 6.1a-b show workers' responses, which clearly indicate the intensification of workload and stress because of the introduction of lean production control. Seven out of ten direct production workers (71% and 73%) gave positive responses to the two questions. The proportions of maintenance workers giving positive answers were 72% and 66 %, and those of corresponding group leaders 58% and 76%, respectively.

Figure 6.1a Workers' Perceptions of the Changes in Workloads by Job Category.



Total N=473

Figure 6.1b Workers' Perceptions of the Changes in Work-Related Stress Levels by Job Category.

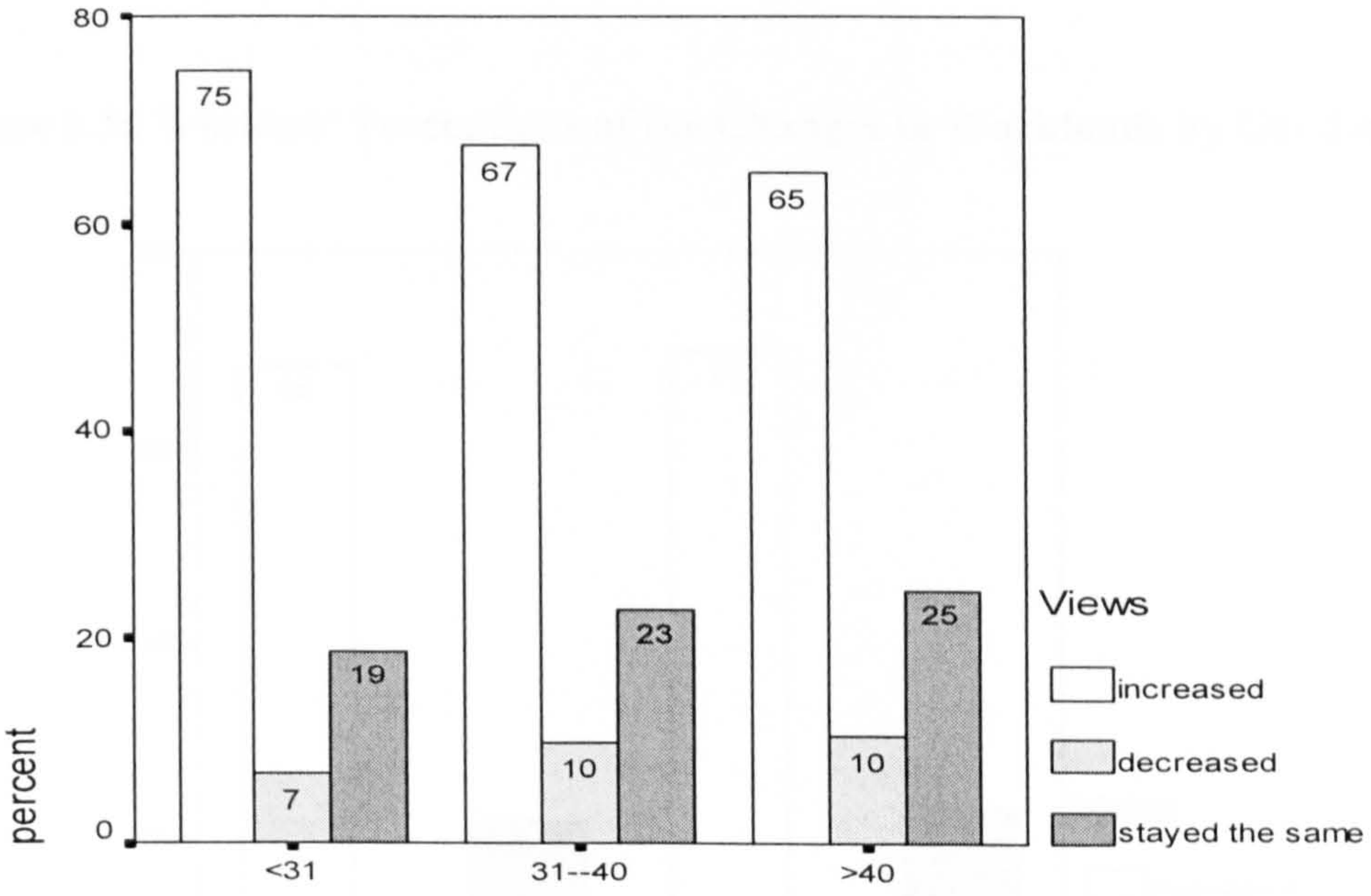


Total N=473

From Figures 6.1a, it is can be seen that, on average, 70% of workers claimed that the workloads had increased, this is in accordance with the previous result that two-thirds of worker felt their jobs made them work very hard (see Table 6.1). Regarding job categories, production workers (71%) were more likely than group leaders (58%) to agree that their workload had increased, this has supported my previous speculation that the workload of production workers might not be lower than that of group leaders because half the young production workers (under 31) did not perceive they worked hard (Table 6.2). Comparing Figure 6.1b with Table 6.1c, workers in the three categories had similar feelings about the increased work-related stress. However, workers (72%, on average) were more likely to report increased stress than to claim that they worried a lot about their work outside working hours (43%). This may reflect the fact that there were multiple reasons for worker stress such as increased responsibility for product quality and machine maintenance.

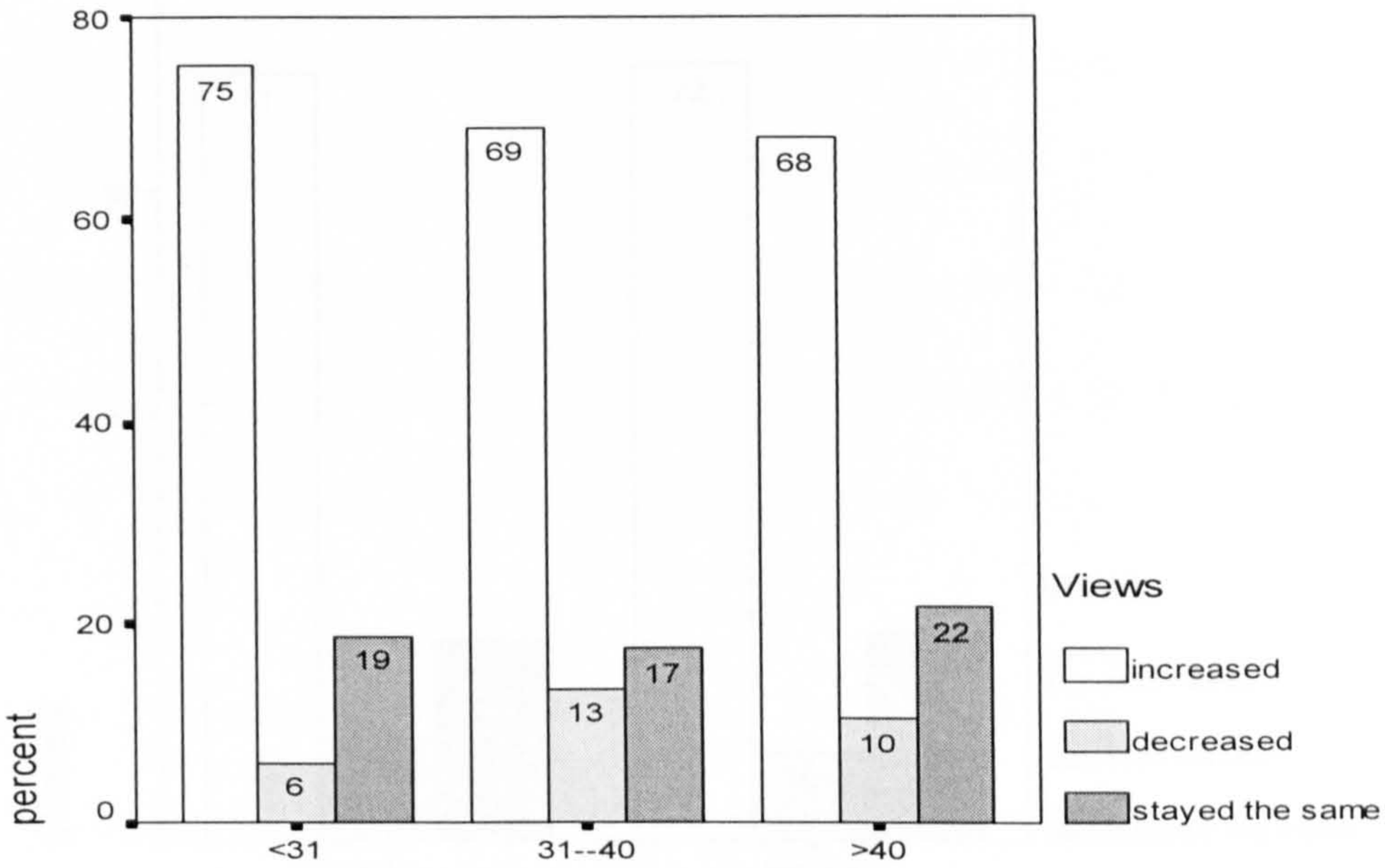
Figures 6.2a and 6.2b show that young workers (under age of 31) were more likely than the others to report increased workload and stress whilst they were less likely than others to claim they had to work very hard and worried a lot about work outside of working hour (see Table 6.3a and 6.3c). The underlying fact was revealed by workers interviewed. Workers indicated that young workers in SAIC occupied heavy and intense work posts with increased responsibility under management control. This may be further evidence that analysis of workers' perceptions of work intensity and stress needs to take age into account. The relatively good physical and health condition of young workers affected how they judged things.

Figure 6.2a Workers' Perceptions of the Changes in Workloads by Age Group.



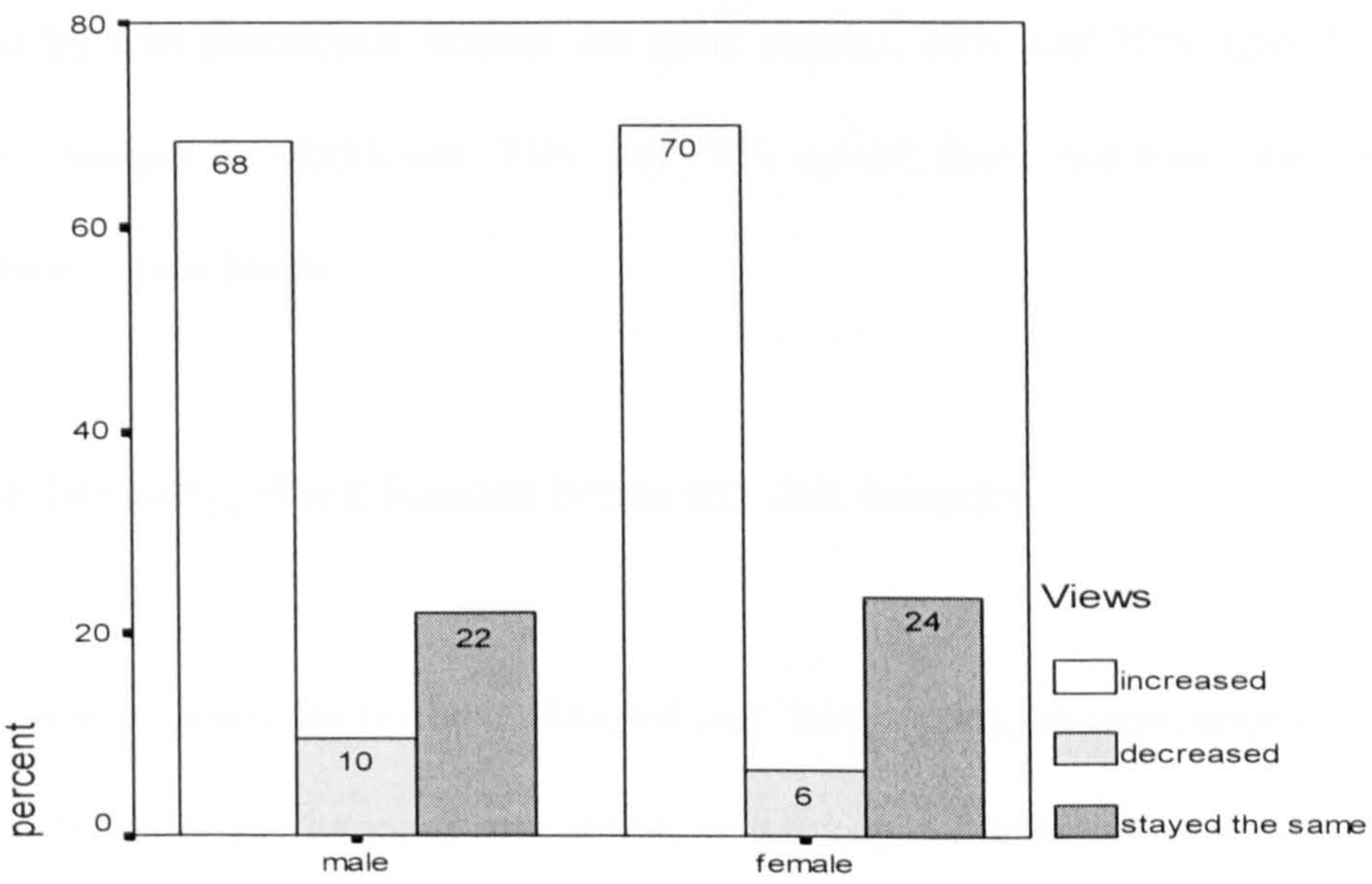
Total N=502

Figure 6.2b Workers' Perceptions of the Changes in Work-Related Stress Levels by Age Group.



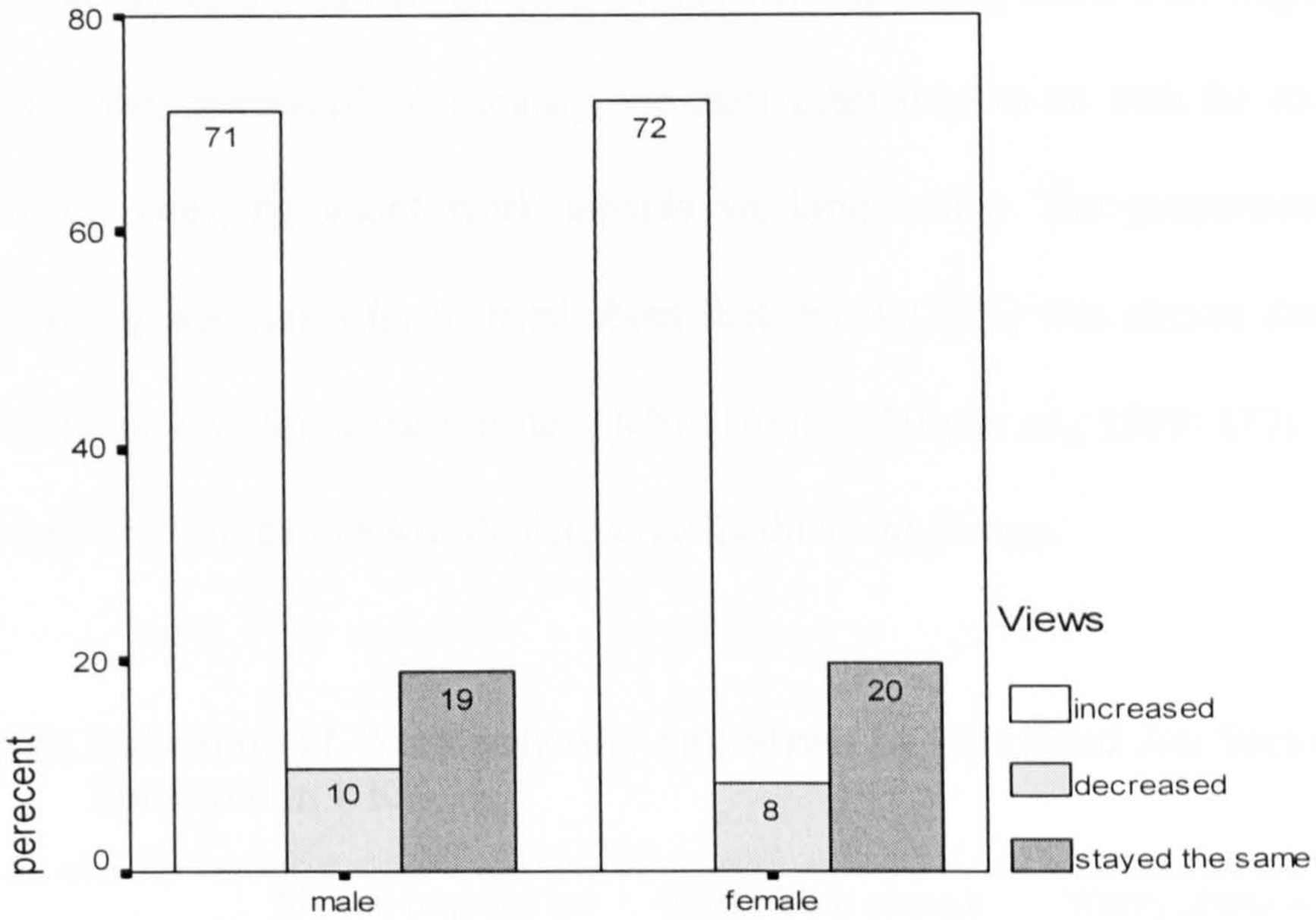
Total N=504

Figure 6.3a Workers' Perceptions of the Changes in Workloads by Gender.



Total N=511

Figure 6.3b Workers' Perceptions of the Changes in Work-Related Stress Levels by Gender.



Total N=512

Gender was not a factor in the responses, as seen in Figures 6.3a-b. The proportions of men and women who agreed that their workload and stress were increased by lean production control are quite similar, 68% and 70% agreed there had been changes to workloads, 71% and 72% agreed there had been changes in work-related stress levels.

6.1.3 Job Intensity, Work-Related Stress and Job Security

Many Western commentators have claimed that 'heightened job insecurity will lead to greater levels of job intensity and stress, as workers work harder to stave off the prospect of job loss or, more directly, worry about the consequences of job loss' (cited in Cully *et al.*, 1999: 173). The survey results in the UK showed that 'there

was no clear link between perceived job security and how hard employees reported that they had to work'. 'However, on the other two measures, there were negative associations with perceived job security, the most substantial to do with the stress-related item: worrying about work outside working hours. The proportion of workers feeling insecure who worried about their work (34%) was almost double that of workers who felt secure in their jobs (19%)' (Cully *et al.*, 1999: 173) (see Table 6.6a). The survey in SAIC depicts a totally different picture.

Table 6.6a Indicators of Work Intensity and Stress by Perceived Job Security, Surveyed in UK.

	My job requires me to work hard (n=24,072)	Never have enough time to get work done (n=24,072)	Worry about work outside working hours (n=24,072)
Employees feel their job is secure	% of workers who agree	% of workers who agree	% of workers who agree
Secure	77	37	19
Neutral	77	44	25
Insecure	73	47	34
All employees	76	41	23

Source: Cully *et al.*, 1999: 173.

Table 6.6b Indicators of Work Intensity and Stress by Perceived Job Security, Surveyed in SAIC.

	My job requires me to work hard (n=531)	Never have enough time to get work done (n=522)	Worry about work outside working hours (n=517)
Workers Feel their Job is secure	% of workers who agree	% of workers who agree	% of workers who agree
Secure	91	45	58
Neutral	40	4	22
Insecure	41	9	21
All employees	66	26	40

Amongst the surveyed workers, 51% agreed that their jobs were secure, 18% disagreed, and 32% chose neither of these two options. The proportion of workers giving positive responses to the three statements is listed in Table 6.6b. The proportion of the workers feeling insecure who were required to work hard (41%) is less than a half of that of workers who felt secure in their jobs (91%). As for the workers who thought they never had enough time to get their work done, the ratio of the proportions drops to less than 1:5 (9% against 45%), and for the workers who worried about their work outside of working hours, the ratio is less than 1:2 (21% against 58%). These positive associations reflect the fact that job insecurity does not serve as an important mediating factor. This result might be explained in this way. Firstly, job security was not a major concern for most workers in SAIC at the survey time because the Chinese auto industry was still in a period of rapid development. Secondly, 63% of workers had served their firms for more than 10 years. They had rich experience in components-manufacturing processes in the firms. This not only made them feel secure in their jobs, but also meant they had to work hard when their firms faced strong competition. Thirdly, because workers perceived their jobs were secure so they accepted the new management system--lean production. It is the lean production system that puts huge pressure on workers; it makes workers work hard and causes them to worry about their job outside of working hours, as is described and further explained in the next section.

6.2 Modern Management Techniques and Labour Intensification

According to Karl Marx, surplus value may be produced either by lengthening work hours or by increasing labour intensity, thus revolutionising the means of production by applying new techniques. The former increases absolute surplus value and the latter relative surplus value. Lean production is regarded as an effective production system to produce high relative surplus value. To achieve high outputs with low inputs, management in the auto components companies of SAIC have utilised several lean production techniques in order to enhance control over the labour process. Here we examine how these managerial controls result in the intensification of labour.

6.2.1 Multi-tasking Operation

As discussed in Chapter 5, in order to eliminate work-in-progress inventories, the management in SAIC introduced new production techniques such as one-piece flow and cellular manufacturing. In 1994, Auto-1 was the first to adopt cellular manufacturing amongst the sample firms. From 1995 onwards, other firms gradually designed their cell layout and rearranged work assignments. The equipment layout in cellular manufacturing differs from that of previous production systems. A manager described how work was done prior to cellular manufacturing:

> Before 1995, the machines in my workshop were grouped according to their functions. Accordingly, workers formed several groups, with each worker operating one machine. For example, mill operators who merely did milling formed a milling group and drill operators who only did drilling formed a

> drilling group. After processing by one machine, components needed to be stored and moved to the next processing area by conveyors. This caused excessive work-in-progress inventories and unnecessary movement (in Auto-5).

A cell consists of a set of machines with different functions. These machines were arranged according to the processing sequence so that only a few processes can be done within one cell. Cellular manufacturing reduces components movements. The manager continued to explain how a U-shaped cell worked:

> We established our U-shaped cells in 1995. Different machines and tasks were grouped together according to product family rather than machine function. The U-shaped cell was designed to minimise workers' walking time and handling of materials. Workers' jobs were reassigned. I mean, a multi-skilled worker should be able to operate at least three machines with different functions and do, for example, planing, milling and drilling skilfully. Finished components were transferred on a transferring chain to the next cell (Auto-5).

The effect of cellular manufacturing was obvious. After two months of cellular manufacturing, the work-in-progress inventories of four components on this shop floor dropped by 11%, the cycle time from semi-finished products to heat treatment was reduced from 20-25 days to 8-10 days, and two workers were made redundant. This manager admitted that he did not like the U-shaped layout at the beginning but changed his mind later when he saw the benefits. So far, 87% of workers in my sample have been involved in multi-tasking operations.

Whilst this firm was benefiting from the changes from single-machine specialisation to multi-tasking operations, workers suffered from the ramp-up of

workloads. With the introduction of cellular manufacturing, the productive time increased from 31% to 53% in this workshop because one worker operated many machines at the same time or in sequence. A majority of operators interviewed believed that managerial control was the main reason that workloads were heavier. Shen in Auto-3 made a comparison:

> Several years ago, I could pace myself and create a break. At least I could sit down for a while when I was really tired. But now I have to cope with two or three running machines. I cannot choose when I take a break. I am always on my feet from one bell ring to another (a group leader in the Hot Roll Shop Floor).

When asked about the multi-tasking operation, Qian complained:

> I mean, it is hard to look after two machines. I have no spare time between completing one job and starting the next one. Is this an excessive requirement? Yes. I do need to get a minute's breather. I can hardly bear this workload in regard to my physical capacity (an operator in the automotive chassis plant of Auto-2).

Wang showed her sympathy to the operatives:

> To run several machines in sequence, operators on the assembly line have to keep walking instead of sitting down as they used to do. Furthermore, they need to walk quickly to keep up the flow, to detect defective products and to respond to machine problems. They are dead tired. I am very sympathetic to them (a female union official in Auto-10).

The implementation of multi-tasking operation was a difficult and traumatic process. Wang stated:

At the outset of applying the multi-tasking operation in my firm, workers complained a lot about the intensification of labour and a lack of safety protection. When a pregnant woman lost her embryo during her work hours, this invoked strong criticism. Workers related this incident to their heavy workload. As a director of the manufacturing department, I was at the centre of this criticism and under great pressure as to whether I should keep this production practice. Later, we carried on the practice, but shifted female operators to lighter production duties (a director of the manufacturing department in Auto-1).

After learning the lessons from Auto-1, management in other firms merely chose young men to carry out experiments on the shop floor. They also adopted other methods, such as education and incentives, to ease the criticism and the strong resentment of workers. A worker gave an example of how management persuaded workers to accept the new system:

You know, I could not believe that I had to handle two machines instead of one. I thought, this would be twice as hard as I used to work. I attended a lot of meetings in the early days. The management told us that our company faced two choices: using the new production system or being defeated in market competition. In order to produce components for the Santana car efficiently, we had to give up old ideas with the old production system and work hard in the new system. No matter whether or not I understood what management said, I had to do what I was told, otherwise I had to leave. You know, it is impossible to get an easy job nowadays. It took me several months to learn about managing two machines (in Auto-3).

Wang in Auto-1 told me very frankly how he used material incentives in the first stage when workers shifted from single task to multi-tasking and then abolished it later:

At the beginning of operating two machines, a worker could get a bonus for eight extra hours each day. Later when workers got used to operating two machines, I told them that the bonus was unreasonable because the labour intensity was reduced through the increasing level of automation and investment in equipment. I persisted that a worker operating two machines was fair and the company had to make profits from its investment. So the bonus was gradually dismantled. Workers were angered by this decision. But they had to accept it because they knew this decision was made by top managers. Workers could not change it (a director of the manufacturing department in Auto-1).

Now workers are getting used to multi-tasking operations. The headquarters of SAIC issued a circular to all workers and asked them to carry out two '1x3' projects, that is, each worker should be able to operate at least three machines and each machine should have at least three capable operators to use it. As for capable workers, the management encouraged them to be familiar with all the skills of the production process. These workers are called '*Yi Xian Tong*' in Chinese. Now a worker operates 2.6 machines on average. The most capable operative can use six machines in Auto-1. The multi-tasking operations greatly reduce labour costs, but it is achieved only through the intensification of labour.

6.2.2 Work Pace Speed-up

In 1999, the output of the Santana car in SVW reached 245,000 units, which is 53% higher than the 1995 production (160,000 units). During the same period, car components manufacturers in SAIC met the demands from SVW without recruiting new workers. This was mainly achieved with the help of lean production techniques. Although some new production lines were set up from 1995 to 1999,

the workers on these lines came from existing production groups. This resulted in a significant decrease of workers numbers in these production groups. Quantitatively, the number in a group in Auto-1 decreased from 26 to 19. A group in Auto-5 lost 14 operators out of 30. Does this mean that the production quota is reduced accordingly? The answer is 'no'. For example, in a team of the cool roll workshop in Auto-3, the number of workers dropped from 12 to 7, but the output per worker increased six times (from 20,000 units to 120,000 units). This greatly increased output by the same number of workers (*zhen chang bu zhen ren*) was felt to be an onerous workload by workers; workers often use the term 'overburdened' to describe their situation.

How did management achieve their targets? Normally workers worked eight hours a day, although shifts and timetables in the sample enterprises were diverse. For example, workers in Auto-1 did one shift from 7:00am to 3:30pm with a half-hour lunch break and two ten-minute tea breaks. In Auto-3, two shifts were operated, one from 6:30am to 3:00pm and the other from 2:30pm to 11:00pm. Forty four per cent of surveyed workers did shifts. Facing huge output demands and fixed work hours, the management in SAIC focused on increasing efficiency by minimising idle time (i.e. by closing up the porosity of the working day) and eliminating all unnecessary motions of workers. They issued the 'full-load work method (*manfuhe gongzuofa*)' and tried to squeeze 60 seconds work out of each minute and 60 minutes work out of each hour from every worker. The standardisation of operations was a key step in eliminating unnecessary motions of workers and minimising idle time of both workers and equipment. For the head of department of manufacturing, the low utilisation rates meant a waste of resources:

You know, a worker should be able to produce 8 springs a day, but he just did 4 at that time. The work pace was too slow. It resulted in huge waste not only in human resources and equipment, but also in electricity energy, which cost RMB 40,000 a day. I was in charge of the study of standardised operation in my firm. After applying the standardised operation approach, the work pace was significantly improved, we not only increased the group output, but also transferred two workers to other groups. We saved a lot (in Auto-3).

In auto-1, Wang indicated how he introduced the first practical scheme of standardised operations:

> I took part in the introduction of standardised operations in my firm. I watched all motions an operative made, measured the time of each motion and the time between the motions, and listed the motions and the time in a table. I discussed the table with my engineers and determined which motions were necessary and which were not. I tried to eliminate unnecessary motions and shorten the idle time. Then the first practical scheme of standardised operations came out. I explained my scheme to the operatives and asked them to follow it.

In the majority of sample enterprises, video recorders and computers were used in assessing standardised operations. An engineer explained to me:

> I found that video recorders and computers were very useful in popularising standardised operations. I used a video recorder to record live operations of some workers and analysed their operations. During group meetings, I showed workers the records, pointed out unnecessary motions and persuaded them to give up their own methods. I used a computer to demonstrate to them the proposed standard operations and left a copy with them so that they could compare their process with the standard ones from time to time.

Did workers co-operate with the engineers and managers on 'time and motion

studies'? The head of the department of manufacturing in Auto-3 told me a story:

> One day, I was watching the operation of a worker and preparing to record his operation. 'Pa', I heard a sound and found that the worker switched off his machine. He told me that he was leaving for lunch, but I knew he was reluctant to be recorded. I had to continue my work after the lunch break.

The 'standardised operation' procedure is designed not only to speed up the pace of workers, but also enables the whole production process to run smoothly. This requires every worker to use the 'standardised operation' procedure, as Ru explained:

> The standardisation of operations is required for smooth production which is the cornerstone of the JIT production. In a multi-process production line, every worker, who may handle several machines with their different processes, needs to follow the standard work pace and complete their work within a specified cycle time, that is, all workers work in phase to allow production to run smoothly. Any worker who does not follow 'standardised operation' will cause the worker next to him/her to wait and increase group idle time (one production manager in Auto-1).

Did workers follow standardised operations laid down by engineers and managers?

Ru continued:

> To be honest, I found from workers' facial expressions they were resentful when I asked them to use the 'standardised operations' procedure, I mean, they did not like to follow the scheme and timetable. It took time to change their habits.

A production manager in Auto-5 told a similar story:

> Since carrying out one-piece flow, I asked all workers to use the 'standardised operations' process. However, a few workers stuck with their old behaviour. This disturbed the whole flow on our production line. It was difficult to monitor because some workers did not fill in the form on the notice-board. They saw filling in papers as a useless task.

How did workers react to the standardised operations? Fan in Auto-5 said:

> I agree that my previous productivity was indeed too low, which was not good for the future of my factory. The 'standardised operations' does improve our work efficiency. However, I hate someone watching me when I am working. At the time 'standardised operations' were introduced, the work pace was reasonable. Later it became faster and faster. I am really exhausted now. The managers always think about how to increase my production quota. I hope they will consider my capability when constantly changing the so-called standardised operation procedure and making us work harder and harder.

Through the standardisation of operations, an invisible peer pressure from co-workers also forced operators to speed up their work pace. Moreover, management used notice boards to display and monitor workers performance every hour. It was a common result that work time had increased and free time on the job was strictly limited. When absences occurred, the remaining workers had to do extra work because there were not enough workers available for a full complement.

It is found that the workload of workers was significantly increased, which could be seen from operation rate data, as one engineer put it:

> The operation rate is an index to measure the workload of workers. It is defined by the ratio of the total operation time of a worker and the allowed maximum time for a component to stay at its position. The former includes all

time spent on switching on his/her machines, loading components, switching off the machines, unloading the components, checking the machines and components, changing tools, cleaning, walking and so on. It decreases with the automation level of the machines. The latter depends on the production quota: the higher the quota, the smaller the cycle time. Eliminating unnecessary motions and improving poor motion can decrease the rate, whilst increasing the quota increases the rate. Before applying lean production, the operation rate was about 40%. This was too low. Now we have decided that the operation rate for first-line workers should be in a range between 60% and 65% and the rate for off line workers in a range between 50% and 60% (Auto-1).

When I visited some firms in SAIC, I found that the operation rate had actually reached 75%. However, a worker complained:

> I was told that eliminating all unnecessary motions could make us work smarter rather than harder. However, any idle time created has been filled up with another task. The workload and pressure became much higher than before (in Auto-2).

No doubt, as the porosity of the working day was reduced, some misunderstanding and conflicts started to occur. A worker in Auto-5 complained:

> They (engineers or managers) sit in their offices comfortably and run the production procedure with a computer. How can they understand how hard I am working when I am asked to complete an action every 20 seconds or assemble one part in 36 seconds and to keep repeating this process from 7:00am to 3:30pm?

A manager experienced such conflict personally, he reported:

> One day, when I asked a worker to use the 'standardised operation', he

> shouted at me, 'look at those (maintenance workers) and those (managerial staff), why should I do my work so quickly? Am I at the bottom of society?'

Production managers and group leaders had to spend a lot of time to persuade workers. It seemed that it became more and more difficult to achieve their goals after the speeding up of the work pace. A worker in Auto-2 told me:

> I expect them (engineers) to come up with some ideas for eliminating non-value-added labour through the kaizen process. But I do not want to be forced to accelerate work pace endlessly. You see, there are only two ten minute breaks each shift and a lunch break. I hardly have a few minutes free to go to the toilet except by calling the group leader for help in extreme emergency conditions.

The demand for car components declined slightly in 2000, but could workers slow down their work pace? The answer was in the negative. Workers were still asked to do their work according to the standardised operation and achieve 60 seconds working time for every minute. When the production quota was fulfilled, workers were asked to shut down their machines and to stay at home. On the days when demand was intermittent, workers received no pay of about RMB 30 per day when they stayed at home (see Chapter 8). This suggested that production flexibility did not unwind workers workloads.

6.2.3 Total Productive Maintenance (TPM)

Zero malfunction of equipment is one of the goals of lean production. Zero malfunction enables management to squeeze out sixty minutes of useful work from

every worker in every hour. If the management puts large investments into modernising the firm's equipment, the zero malfunction of equipment should be easier to reach. However, the management imported key equipment which was second hand and regularly broke down, although the equipment was better than what had previously been used. In order to reduce the number of indirect workers, the management added pressure to both the remaining maintenance workers and their production colleagues.

TPM was then introduced into SAIC. The goal of TPM is to gain productivity, not merely to maintain machines. TPM aims at preventing problems instead of merely reacting to them. According to the training booklet used in SAIC, TPM means that all departments associated with production have a maintenance function, and management and product development requires the participation of all employees, in order to prolong the life time of equipment and to pursue to the limits of their efficiency. TPM aims at improving the quality of outputs both through improving the quality of employees, and the quality of equipment. Here improving the quality of employees includes giving responsibility to all employees, increasing the self-maintenance capacity of operatives, and broadening the capability of maintenance workers from their own speciality into other skills. Engineers are expected to design equipment with no or lower maintenance needs. The practice of TPM was introduced in 1993 and changed the whole equipment management system in SAIC. As a result, both maintenance workers and operators were given additional tasks. Wang compared the situation prior to and after the application of TPM:

Before the application of lean production, the maintenance of equipment was centrally organised at workshop level and only involved maintenance workers. Operatives paid little attention to maintenance. When a machine broke down, maintenance workers rushed to repair it like fire fighters. If they were not called, maintenance workers enjoyed sitting in their room and chatting with each other. They did not worry about the interruption to production because of the massive work-in-progress inventories.

> Now, we have a very limited work-in-progress inventory. Therefore, it is essential to keep every machine running smoothly, otherwise the production line has to stop. To achieve zero malfunctions of machines, everyone has got his/her responsibilities from the maintenance workers, through direct production workers to managers. Equipment management is weighted heavily in our assessment (second only to quality control). The score against this assessment is closely associated with our pay. I always worry about our machines because they are more than ten years old (a manager in Auto-1).

Since the introduction of TPM, the maintenance workers had suffered more stress because stoppage of the production line drew the attention of upper management. This in turn created added pressure from above for rapid correction. A maintenance worker indicated how the slack previously in the line had gone and he was now working stressfully:

> The old times have gone. Now I cannot just sit in my room and wait for reports from operatives. I am asked to check machines at least three times per shift. I have to keep walking around the machines and try to sense any minor changes in smell, noise, vibration and so on. I am always worrying about breakdowns during my shift because it means a cut in my bonus and the interruption of the whole production line. In case a piece of equipment breaks down, I should arrive at the point of production within 20 minutes and fix it within a limited time. In the most serious scenario, I am only given two days to complete my work (in Auto-1).

The maintenance workers had extra workloads, as one put it:

> Now I have to spend a lot of my time on regular checks and maintenance to prevent any malfunction of the machines. As for major equipment, we have got a special maintenance plan that includes condition monitoring, preventive repair and maintenance, first grade maintenance (every 500 hours), second grade maintenance (every 2,500 hours), fine adjustment and checks (every year). I must fill in forms and keep all maintenance records for further inspection (in Auto-3).

Most maintenance workers had to work at weekends or during holidays because the machines were fully occupied during workdays, a worker complained:

> You know, these key imported facilities are second-hand and have run for about ten years. They regularly break down. I often have to carry on my work after the bell and cannot go home on time. I also spend a lot of weekends and public holidays doing regular maintenance in order to avoid interrupting the normal production. This makes me very tired. I hate working in this way, but I have no choice. One day when I objected to working at the weekend, my manager said to me: 'this is your work, isn't it? If you do not want to work at weekends, would you like to be an operator?' I was an operator and did the hardest work in the firm (in Auto-2).

One of the most striking features of TPM is that operatives maintain their own machines. Yu told me that:

> Now I not only operate the machine, but also do some maintenance that was normally done by maintenance workers. At the start of each shift I need to carry out an 'aircraft style' check on my machines according to a list. This is called 'self-check'. Then, a maintenance worker checks them again and signs a form. Our group leader may check machines randomly. I was trained and expected to have 'four abilities', that is, the ability to find any abnormal phenomena; the ability to deal with the abnormality correctly and quickly; the

> ability to set up the check criteria by myself and the ability to operate machines according to standard procedure. Before I go home, I need to check out the machine again and sign the production point card. This is overtime work without any extra pay (an operator in Auto-2).

A worker in Auto-1 pointed out the same experience:

> It is not easy to be an operative. When I find a problem on my machine now, my first reaction is not to find a maintenance worker, but to diagnose the problem and try to fix it by myself. This is called self-maintenance. Sometimes, the problem is simple, I can solve it by replacing the damaged part with a new plug-in one. Sometimes, I have to dismantle and repair the machine, a task previously undertaken by skilled fitters and electricians.

Another worker indicated he had to do cleaning work to maintain equipment:

> In my workshop, 6S has been implemented. The important point of 6S is that the workplace should be tidy, clean and in order and every operative should have such kind of good habits. I have to spend lots of my time to clean and lubricate machines and try to avoid damage by dirt, dust and grit. The management told us to shift traditional thinking away from 'maintenance is someone else responsibility' to 'it's everyone's business, every day'.

The comments of the direct production workers above indicate that the self-maintenance programme under TPM obviously intensified their workloads. The climate of strain on the shop floor makes the workers an adjunct to the machine rather than the other way around. It is evident that lean production in SAIC is somewhat similar to the Fordist management method that treated workers as merely an appendage of the production apparatus (Dohse, 1985: 124).

6.2.4 Quality Control

For production workers, the greatest pressure comes from the daily quality control. They have been given additional tasks and responsibilities for quality control since the application of lean production. When a defective product occurs, there are few spares in stock to replace it and the problem is immediately exposed so that employees will then be more alert to avoiding even minor problems. Zero defects remains the top priority of management in SAIC. To achieve this goal, management changed their quality control philosophy and set up a new quality control system. The head of the production department outlined quality control:

> Quality control now places great emphasis on making products right the first time. Our previous focus of 'not delivering substandard products' are replaced with 'not producing substandard products', that is, a quality of product does not rely on inspection at the end of a shift but on the whole production process. We firstly ask production workers to undertake self-inspection. Every worker must follow the guidelines of 'not producing, not passing and not using substandard products (*bu Shen chan, bu chuan di and bu shi yong bu he ge chan pin*)'. Group leaders and production managers also have their commitment to quality control. Specific checkpoints have been set up in order to minimise any potential quality problems. Effective reward and punishment regulations are used. Now everyone in SAIC treats quality control very seriously (in Auto-1).

Obviously, management passed the pressure of quality control to workers. Tang explained how product quality was related to pay:

> According to the rules, if worker A made a defective part that was found by worker B next to worker A, then worker A would lose two grades in bonus of one month. If worker B did not find the defect and passed the defective part to

> worker C who then found the problem, both worker A and worker B would receive a reduced salary in that month. Worker B would be further punished due to passing that defective part. Therefore worker C would be awarded one grade in output salary (a group leader in the welding workshop in Auto-2).

The quality control system also resulted in tremendous psychological pressure on workers because all products were marked by individual producer. A worker in Auto-6 told me:

> You know, my colleagues check my products, my group leader and even managers also check my products. I was asked to mark every product I made. This means any quality problem associated with my products can be easily traced back to me. Every morning, my group leader holds a short meeting and informs us about quality problems that have been found. I always worry about my name being mentioned.

A push-button was another way to show the quality problems, as another worker said:

> In my workshop, every worker has a push-button at his/her workstation. As a serious quality problem is found, the worker can push this button and switch on the red light in a prominent position in the workshop. Everyone will know what is happening. Some workers will gossip, 'he/she is a skilled worker, how could he/she do things like that'. Because every quality problem is recorded, group leaders and the production manager will be informed. Sometimes, a director is informed as well. Management is asked to punish the worker in order to prevent a recurrence of such defects. The pressure is unbearable (Auto-5).

When production group management is assessed, 'quality control' ranks at the top of the list. Group leaders and line supervisors also felt huge pressures. Qiu told me

how she was scared of quality incidents:

> Quality control certainly is a tight system. Every one understands that. As an assembly group leader, I am always nervous. Last year, SGM rejected all our products. The incident was broadcast to all employees. I was asked to find the reason and warned to avoid this happening again. My bonus was cut for three months (a female group leader in Auto-6).

Ru told me about his experiences:

> Checking products is one of my tasks now. I always worry about the occurrence of a quality problem. When the telephone rings I am nervous even at home. I do not receive phone calls unless I have to. I do not want nasty things to happen, but sometimes they do happen. Last week, I was sick and stayed at home. I was told that 2,000 springs were returned by my customer. Although the products were free from any technical faults, their appearance did not meet the requirement of the customer. I was fined RMB 1,000 and I was removed from the supervisor position (a supervisor in Auto-3).

Some workers complained that speeding up the production pace made it difficult to check their products carefully. A worker expressed his feelings:

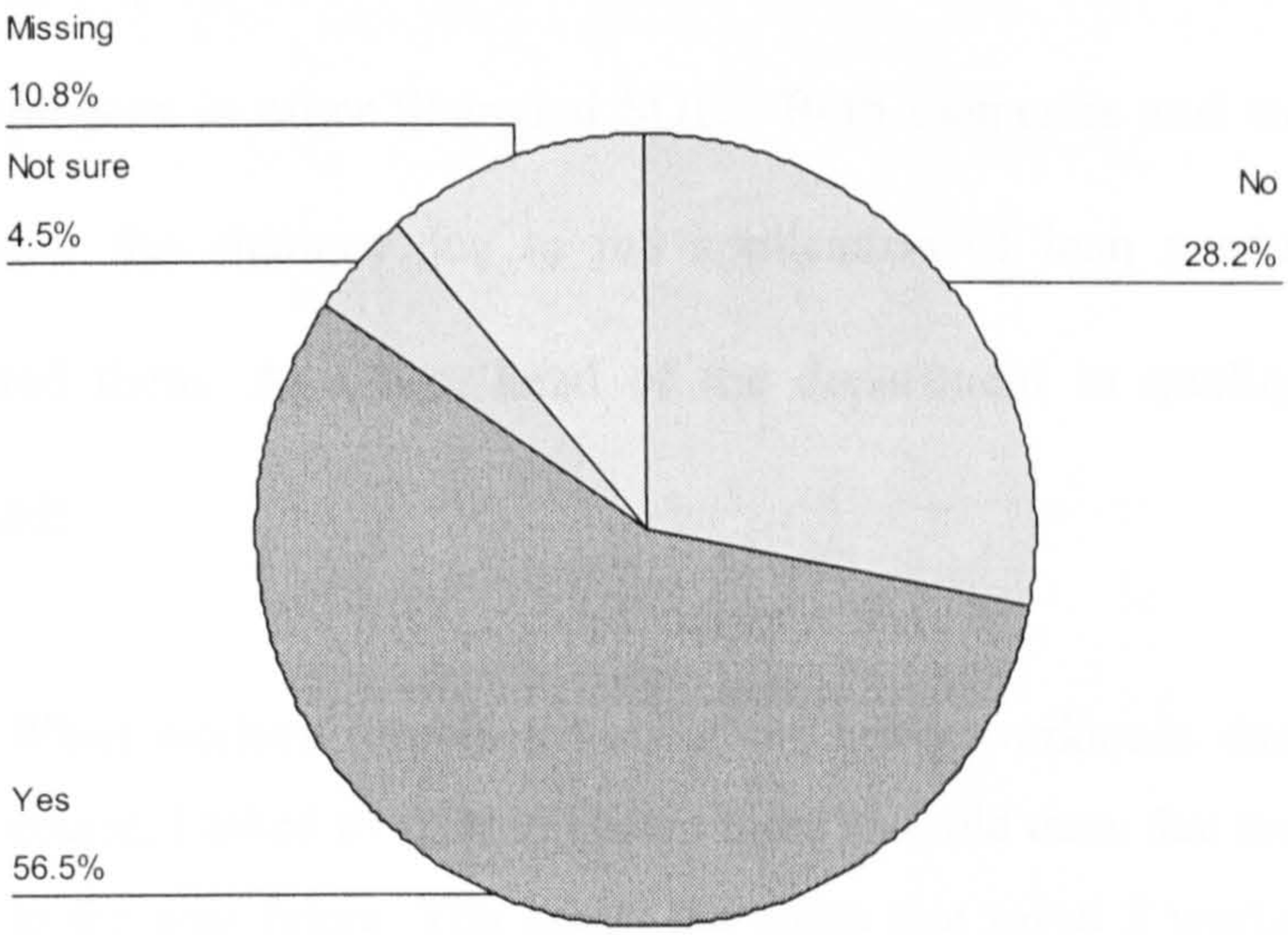
> Now one-piece flow cuts costs and increases productivity, however, in order to achieve the targets I have to speed up my work pace. This brings new problems. I no longer have enough time to check my products carefully.

6.3 Did Workers Accept the Intensified Labour?

As discussed above, the new management technique of lean production made workers work much harder and more stressed. Did workers accept the intensified labour? A majority of respondents gave an affirmative answer. As shown in Figure

6.4, 57% of workers thought they could work at the pace of their current job until they are the age of 55 or reach retirement. The official retirement age is 55 for male worker and 50 for female workers in China. This proportion is much higher than those car workers in some other countries. 78 per cent of Canadian vehicle assembly workers thought it unlikely they could sustain the pace until age 60, 68 percent in UK (Lewchuk, Stewart and Yates, 2001: 76) and 94 percent in Turkey (Nichols *et al.*, working paper).

Figure 6.4 Responses to 'Could You Work at the Pace of Your Current Job until You Are Age of 55 or Reach Retirement?'



Total N=582

This does not mean that the intensity was still bearable for more than half the car workers in China. Several reasons can be explained by the workers who were interviewed. Firstly, the updating of machines and some Kaizen activities partially reduced work intensity. Xie reported his perceptions on the advanced equipment:

Human potential is limited. Only advanced machines can make our life easier and improve productivity dramatically. My group imported a world-class connecting-rod bearing automated line from Great Britain. It was difficult to cope with the line at the beginning. However, after I got used to operating the line, I felt so wonderful. I don't feel any physical fatigue because the machine is of a high level of automation (a group leader in Auto-4).

Secondly, better pay made workers accept harder work. The intensified labour is strongly linked to labour saving which produces profits, it will be discussed in Chapter 7. In recent years, SAIC achieved better economic efficiency than other automotive companies in China. This was reflected in workers' pay. The average wage of employees in state-owned firms in SAIC is about double the average wage of employees in other Shanghai SOEs. Both managers and workers indicated that they saw the changes due to the application of lean production and gradually accepted them. As Chen, head of the department in quality control in Auto-4, testified:

> When workers complained about the heavy workloads during the training course, I asked workers to endure these and told them that they would benefit in the near future. You know, the group that saved 3 workers almost saved RMB 60,000 a year; workers bonuses were increased significantly. Workers now understand what I said before.

Shen in Auto-3 stated the change of workers' attitudes to multi-tasking operation:

> At the beginning, workers were passive to do what managers asked, for example, multi-tasking operations. Now they do it on their own initiative because they see higher efficiency and get higher incomes. Workers have realised that today's changes must be credited to the application of modern management techniques.

By contrast, workers in low profit firms have different feelings, as a worker in Auto-5 put it:

> My job has a full workload and quick work pace. I have no choice. Look at my friends and relatives who lost their jobs recently, I feel a little lucky. I need a job. I would feel it fair if I could get a salary that matches my labour. But I cannot.

Finally, the most important, and real reason was that psychological pressure from the rising unemployment rate in China made workers tolerate heavy workloads. In their words, 'if I do not work hard today then I will have to make an effort to find a job tomorrow'. In fact, layoffs and declines in income will directly affect workers' lives because they have to pay mortgages for their apartment and loan on their cars. In Auto-3, Ru indicated:

> You see, a larger number of workers have been laid off nation-wide and locally. I feel content because I have a job. Workers like me have got used to multi-tasking operations now. I do not mind whether the workload is heavy or not.

Yu, a group leader in Auto-2, expressed similar feelings:

> I am worrying about no work to do rather than more work to do. Comparing myself with those people who were laid off, I cannot complain. I have still got a job although it is a hard one.

When Dohse looked at why Japanese workers accept management systems which increased work and physical stress, he found out one of reason was that workers strongly depend on management. 'At Toyota, management alone decides

on promotions……This dependence on management for career advancement is reinforced at Toyota by an extremely individualised wage system…… The lack of solidarity among Japanese workers as a result of their being so strongly dependent on management personnel decisions is additionally links to the lack of union regulation of shop-level labour deployment and work norms' (Dohse, 1985: 136-139). This point of views was confirmed by the research conducted in China. Workers in the components companies showed a similar dependency on management which had great power over individual's pay and employment. This might be because there was a close parallel between Chinese culture and Japanese culture including hierarchy.

6.4 Health and Safety

A recent Health and Safety Executive survey of self-reported work-related illness in Great Britain found stress, depression and anxiety to be the second most prevalent condition claimed to be caused or made worse by work. New management techniques--quality circles, team working, total quality management and performance related pay schemes--topped the list of reported stressors (cited in Nichols, 1998: 370). As explained in the above sections, the workload and work related stress of workers in SAIC increased significantly due to the introduction of lean production. This trend is expected to continue for a long period of time. Although workers accepted intensified labour, the effect of lean production on health can not be ignored.

Comparison of the health and safety condition is made amongst four countries (see Table 6.7). It is found that workers at four Canadian vehicle assembly plants were most likely to report that they worked in pain half the days in the previous month, and workers in a GM plant in the UK stand second (Lewchuk, Stewart and Yates, 2001). However, Chinese car workers were more likely than Turkish ones to complain about physical pain for more than half the time in the last month (18% compared to 8%); more about dust (32% compared to 5%); about the same amount about temperature (32% compared to 31%); and more about noise (38% compared to 21%). It seems that the physical working conditions in Chinese car factories might be worse than those in Turkey. This might be caused by a fact that most components companies were established on the basis of their original factories which were built 40 to 70 years ago, and some equipment was old whilst some machinery was imported from developed countries.

Table 6.7 Indicators of Physical Discomfort at Work: Reporting Physical Discomfort for Half the Time or More in the Last Month.

Per cent	Canada	UK	Turkey N=100	China N=550
Physical pain or discomfort	42-67	39.3	8	18
Dust related	*	*	5	32
Air temperature related	*	*	31	32
Noise	*	*	21	38

* The data is unavailable. Source: Lewchuk, Stewart and Yates, 2001: 78; Nichols *et al.*, working paper.

After taking account of exposure time, it is found that the most intensive physical discomfort was caused by noise because 27% of workers complained of that problem every day. The second was due to dust in the air. The long term effect

of lean production on health is presently unknown, but may be a real future problem, although more than half the workers thought they could continue their present working practices until their retirement.

There are also positive effects of lean production on health and improvement of physical working conditions. The physical working conditions in these factories are generally good, compared to the standards that prevail in the local informal economy and in medium and small firms in the local formal economy. 65% of respondents thought that their work environment had improved because the environment was generally tidier and clearer. Most workers and union officials mentioned that the work environment was much better than before, as Zou put it:

> It was unimaginable. Before our new production line was introduced, machine oil leaking from old machines lay on the floor. My shoes were soon damaged by it. The jumbled work-in-progress inventories pilled up everywhere. Under lean production, management invested lots of money in new machines and asked us to carry out 6S activities. The work environment has been improved greatly. As you see, the shop floor is tidy and in order. Industrial rubbish is hardly seen. This is beneficial to our health (a union official in Auto-1).

Xie, a group leader in Auto-4, also had the same feelings:

> The management in my firm takes health problems seriously. They try to improve working conditions. For example, summer in Shanghai is very hot and wet, the outdoor temperature can easily reach 38°C. Now 90% of workshops have air-conditions. There are also rules and regulations to reduce health risks. If workers in noisy workshops forget to put their earplugs in, they will be fined. They are also asked to make their workstations clean and tidy.

As for safety, the top manager regarded it as the most important thing in SAIC and it is one of the major items in production group management assessments. 41% of respondents noted that their safety at work has improved, compared with 23% of respondents who claimed a decline of safety. Management claimed that accidents occur much less frequently. Because 'accident rate' is a sensitive topic, it is impossible to get data on this. Management further gave some reasons which helped to drop the accident rate. Workers were trained to enhance safety consciousness and practise self-protection measures. They were asked to monitor each other on safety issues. Group leaders had responsibility for the safety of all group members. Group leaders advised workers to put their safety before production. They walked around and checked safety risks frequently. They had authority to stop a worker operating if they felt it was not safe. I asked workers if the increased work pace had caused a growth in the accident rate. Many workers gave a negative answer. They said that the stringent safety rules prevented accidents from happening. Any behaviour against rules would be punished. For example, regular maintenance should be done on all machines and a worker must wear glasses to protect his eyes from damage from metal splinters and welding flash. Kaizen activities also made workers' operations safer. Yu in Auto-1 said:

> Kaizen has made work much safer. You know, when a worker is running several machines and tired, he may be in danger because he is not able to concentrate. A worker noticed this and made suggestion to install a protective grid on the machine. After their Kaizen activity, workers feel much better and safer (a production manager in No.1 workshop).

It is evident that if things have improved, this may be because they were so bad before. For example, there was previously no guard on a machine. If the

working conditions did not change, workers might be in much worse situation. This is because if workers are working harder than ever before, and under constant stress and surveillance, they will have more accidents, as considerable casework tells us (Berggren, 1993; Babson, 1996; Rinehart, 1996).

6.5 Summary

Qualitative and quantitative data obtained from components companies in SAIC have been presented in this chapter. These data show that lean production control has resulted in significant increases in work intensity and work-related stress in Chinese auto components firms. This chapter has also analysed how these increases are related to some specific management techniques in labour utilisation and work pace control, such as multi-tasking operations, full load work method, total productive maintenance and quality control. It can been seen clearly that the essence of the system is not to turn over control to workers, but to increase management power by using a different form of workforce control (Parker and Slaughter, 1995: 44).

Whilst it is certainly true that labour has been intensified, it is also the case that labour time has been extended--wages not being paid for operatives checking the status of their machines and for performing extra maintenance work used to be done by maintenance workers. Survey evidence indicates that workers gradually accepted the new management techniques under the influence of the severe employment environment in the other industrial sectors in China.

In addition, it is perfectly evident that lean production has not achieved efficiency--if by this is meant full utilisation of resources. Workers are made to work very hard when at work--but, for the sake of profit, they are also sent home to leave resources unused.

The impact of lean production on health and safety is briefly discussed. It is evident that lean production shows both negative and positive influence on health and safety. Because the intensification of labour is on going, the long-term effect of lean production on health and safety should be a major concern.

After an analysis of lean production impacts on workers, in the next chapter, consideration will be given to the changes of work organisation resulting from team working, Kaizen and intensive training.

Chapter Seven

Work Organisation in Transition

A number of influential pieces of research on lean production have endorsed the distinctive Japanese work organisational paradigm as a putative alternative to Fordist mass production. According to Womack and his fellow researchers, Japanese organisational practices constitute a new form of lean production and herald the appearance of a 'Post-Fordist' regime. In their words, lean production places the dynamic work team at the heart of the lean factory. It provides workers with the skills they need to control their work environment and the continuous challenge to make work go more smoothly (Womack *et al.*, 1990: 99-101). Kenney and Florida describe the new organisational form as consisting of overlapping work roles, job rotation, team-based work units and relatively flexible production lines (Kenney and Florida, 1988: 131).

In contrast, Dohse and his colleagues argue that the Japanese management system is simply the practice of the organisational principles of Fordism under conditions in which management prerogatives are largely unlimited (Dohse *et al.*, 1985: 141). Many researchers in the West cite evidence of attempts at strong management control existing in Japanese transplants (Garrahan and Stewart, 1992; Danford, 1999).

Whilst researchers are arguing whether lean production represents an alternative organisational paradigm to Fordism, they sometimes share a common assumption in their implicit acceptance of the existence of a distinctive Japanese

work organisation. Is it possible to transfer the Japanese work organisation paradigm from its original environment to new ones? Empirical research has suggested that team-based work organisation can be effectively transferred to Japanese automotive transplants in the United States (Florida and Kenny, 1991: 381). Another piece of research conducted by Elger and Smith (1994: 38) in the UK indicated that in Japanese transplants, factory regimes were selectively adjusted to fit into local market requirements; particular industrial sector logics and particular labour relations conditions.

To date, there has been no discussion of the issue of transferability of Japanese organisational forms into Chinese firms. China has experienced a transition from a planned economy to a market economy in recent years. By looking at the cases in the auto components companies, I examine the transfer of Japanese work practices to China in respect of two related research questions: To what extent have these auto components companies emulated the new work organisation? Does the transferred organisation take on Chinese characteristics?

This chapter focuses on lean production related organisational changes such as team working, Kaizen and multi-skill training. Based on quantitative and qualitative survey data analysis on the work organisation in the auto components companies, it answers the following questions. What are the characteristics of team working? How were Kaizen activities carried out? Does the training programme make workers multi-skilled?

7.1 Team Working at Auto Components Companies

Team working is a key organisational feature of lean production. The co-operation and involvement of workers in the work environment are seen to be too important to be ignored. In the auto components companies, the management-initiated transformations in work organisation began with the introduction of team working.

7.1.1 The Team Concept

It is difficult to define the term 'team' precisely in a lean production plant because a team may refer either to a work team, the formal structural unit, or to a co-operative group whose members come from different organisational levels. Regarding team functions, Womack *et al.* assert that cross-training, multi-skilling and job rotation take place through the medium of teams. Kenney and Floride (1988: 132) suggest that work organisation is based on 'self-managing' teams. However, critics such as Parker and Slaughter (1995: 48-49) argue that team working leaves workers with less authority and more accountability, and workers are pressured to transfer continually their knowledge to management. Graham (1995: 205) indicates that the team serves as a mechanism of management control. Stewart and Garrahan (1997: 231) point out there is rarely an admission regarding the role of team working in securing surplus value from labour. This implies that workers become agents of their own exploitation.

There are two kinds of teams (*tuan dui*) in the auto components companies. One refers to the production groups which are the basic units, running day-to-day

operations in accordance with the nature of a new production line on the shop floor. The production groups originate from the former work groups called '*ban zhu*'. Each group now has its clearly defined responsibilities, production and quality targets. Every worker is organised into one of the production groups. For example, in the Auto-3, 140 workers and seven managerial officials in the cold roll workshop are divided into seven production groups.

Another form of team is the project team consisting of a small number of industrial engineers, production managers and workers who may come from different production groups. The project team is a temporary organisational unit which is formed to deal with some specific production problems. It engages in improvement activities, operating as QCs. Its aim is not only quality control but also the reduction of costs and non-value added activity. According to my survey, 62% of respondents had been project team members. At the time when I was conducting the survey, 38% of respondents were still project team members. In the mind of most workers the team concept is strongly related to the project team. This can be confirmed by my interviews for, as Tang said:

> On our shop floor, several teams are organised which provide us with opportunities to participate in innovation. These teams are not standing organisations. They will be dismissed as their projects are completed (a worker in Auto-4).

Zhuo said frankly:

> Workers in the (project) teams made many suggestions over the past several years, but there is not any (project) team on my assembly line at the moment because the line is running smoothly and no problems need resolving (a group

leader in the assembly line of Auto-5).

Whatever the understanding of the team concept, it is a fact that workers in the auto components companies have some knowledge of teams. As discussed later, the traditional organisation in SAIC is being transferred and team working reflects a change of work organisation on the shop floor.

7.1.2 Team Working

In China, worker involvement in industrial management and technical innovation has a long history stretching back to 1958 when Chairman Mao promoted the management principle of 'participation, reform and integration' (*Liangcan yigai shanjiehe*). It means that officials should participate in production activities and workers participate in industrial management to reform all unreasonable regulations and rules; engineers and managers should integrate themselves with workers in production practices and technical innovations. It is evident that this principle contains some ideas of Western team working. This principle is no longer mentioned nowadays because the nature of the principle was considered to have been distorted during the so-called 'big leap' and the Cultural Revolution.

After the economic reforms, team working based on work groups was encouraged with the issue of 'regulations for group work'. Awards were given to the groups having done well according to the standards set by the regulations. In 1987, team working was enhanced with the requirement for quality control. Work groups with excellent performance might be named as a self-governing group or a trustworthy group, with the latter at the top level of awards.

A new team working campaign was initiated in 1994 when lean production was first introduced in the components companies in SAIC. The management called for discretion, decentralisation of responsibility and full realisation of workers' potential and inculcated in workers the idea that team working was a 'human-centred', self-managing work practice. This was because they were aware that lean production techniques counted for nothing without the participation and responsibility of employees.

7.1.2.1 Team Working --QCs Activity

At the early stage of applying lean production, managers confronted many challenges in the production process. Team working was first carried out in some experimental firms, and aimed at improving resolving production problems, for example, bottlenecks. From 1995, it spread into every subsidiary of SAIC. Production managers and work groups (*ban zhu)* leaders organised team working at different levels from project teams to work groups.

QCs activities were dedicated to detecting problems, finding the reasons behind them, making formal suggestions and implementing team decisions. Ru in Auto-1 gave an example:

Firstly, one member described a problem and all members would try to find the cause of the problem and the best method to resolve the problem. Finally, the team leader would assign tasks to members. The implementation results might be checked in later team meetings. Those who had their proposals accepted by the team and those who successfully implemented the proposal would be awarded bonuses. Their photos and achievements might also be publicly displayed on notice boards at prominent positions around the firm (a

production manager in the No.1 workshop).

QCs meetings were always recorded. Figure 7.1 is an example of a QCs meeting note. This report was kept on file and was often used in regular progress evaluations. The achievements of QCs activities play an important role in the assessment of individuals, work groups *(ban zhu)* and workshops.

Figure 7.1 A QCs Meeting Note.

A QCs meeting note in Auto-3

Date: 14th Nov. 1998

Place: Main meeting room

Participant: Zhu (QC leader, work group leader), Wu (deputy director of quality control department), Wang (head of technology department), Zhuo (technology engineer), Li (member of quality control department,) Chao (dispatcher of manufacturing department), Zhao (work point engineer) and Gu (work group leader).

Agenda: 1. Li reported the result of a quality examination of randomly selected products.

The pass rate was 100%.

2. Discussion of spring quality problem.

Problem A: load instability

Solution: changing load tolerance, improving winding procedure.

Problem B: spring surface problem--burr

Solution:

Reason	solution	person in charge	complete date
Machine wear out	increasing wear-resistance	Zhou	end of Nov.
Crackle on tool	changing tool	Gu, Zhu	end of Nov.
Poor operation	training	Zhu, Gu	end of Dec.

'Zero Defects' was a major subject of QCs activities and commenced in 1995. It uses a device that can be a detecting instrument, a restricting tool or a signal device to eliminate defects that may occur due to the oversight of workers or

more likely the incompetence of engineers. Normally, team members design the device that can be used to inspect products automatically and to prevent human error related defects. The first example of a zero defect project occurred in Auto-2 in 1995 when bearings kept dropping off bases. The QC team solved the problem by adding a pressure sensor to the assembly machine. When the bearing was parallel to the bearing base and was fitted well, the pressure sensor sent a signal to a green light showing the machine worked well. Otherwise, the sensor sent a signal to a red light and stopped the machine. During the zero defect campaign, workers were encouraged greatly to think about production management and product quality. 267 zero defect projects have been completed and RMB 8.8 million have been saved in Auto-2 since 1995.

7.1.2.2 Team Working--Production Group Management

Production group management is the other form of team working in the auto components companies. With the introduction of lean production (1993), the work group (*ban zhu*), a Chinese traditional production unit based on the production function, started to be transformed into the production group that was regarded as the basic organisational unit. The practices are closely related to original work groups, that is, different work groups may be transformed following different routes. A production group may be formed with the same work group members (for example, on assembly lines), or it may be formed with members coming from different work groups following the restructuring of the layout of workshops into cellular manufacturing. As for production lines born after the introduction of lean production, the related production groups have been set up according to the

requirements of team working. The production group has comprehensive functions and carries out natural group tasks to produce one product or a set of products. Each production group is now responsible for output, quality, material handling and meeting the demands of its downstream 'customers'.

Continuous changes to the production groups and related management were still going on when I was visiting SAIC. The top management of SAIC set a goal to completely transfer the production group to a real lean production team within several years. They have made great efforts to promote production group management. In 1998, a 'circular concerning the further strengthening of production group management' was issued in SAIC, which determined the new meaning and functions of the production groups. This circular advocated team spirit and required group members to participate in quality and productivity improvement programs and to share responsibility for group performance.

Table 7.1 Assessment of Production Group Management.

Dimensions	Percentage	Content
Production	10%	Production targets, work-in-progress inventories.
Flow management	12%	Visible, pull, one-piece flow and U-shape cells.
Human resource	12%	Deployment, operation rating, absenteeism, training.
Safety	12%	Rules, safety education, prevention of accidents.
Cost	16%	Cost reductions, break-down of process to achieve targets.
Equipment	18%	Preventive maintenance, resolution of small problems.
Quality	20%	Checking, analysis of quality targets, control and feedback checking.

Production group management was periodically examined in SAIC. Table 7.1 shows an example of the examination, in which the items listed are weighted differently. The most important items are associated with cost, equipment and quality control. The results of the examination are used in determining performance pay and other awards for the whole production group.

In 1999, 'organisational learning' and 'system thinking' were called for in production group management in SAIC. In a training outline, management believed that organisational learning could constantly bring forth new ideas and could make for a successful enterprise. Management asked workers to treat learning and study as part of their daily job, and to form a good environment of systematic learning. Eventually 'organisational learning' aimed at setting up higher-performance production groups, that was, the learning production group which focuses on members learning from each other, efficiently finding problems and resolving problems with collective wisdom. Management also recommended workers to learn from the book 'Fifth Discipline' (Senge: 1990) about system thinking and asked them to apply the ideas of system thinking in their group management.

7.1.3 Workers' Views about Team Working

As described above, team working is a central element of the new form of work organisation in SAIC. It did significantly improve group performance and make contributions to the increasing productivity of the company. Here I would like to discuss how workers viewed team working. My survey data indicate that workers had mixed feelings toward team working.

Facing a buyers' market, workers did feel that team spirit pulled them together to attain company goals and to beat the competition. As Ru put it:

> In the past, when a worker stopped working because of a machine problem, his colleagues might seize the chance to have a break. But now, if the same thing happens, other group members will help him out. Every group member has commitment to make production go smoothly (a supervisor in Auto-3).

According to the survey result, 85% of respondents agreed that working in teams helped them feel like part of SAIC. 79% of respondents believed that all managers and employees should be members of the same 'company team' (see Table 7.3a). This is also reflected in the interviews, from which I learnt that most workers felt a shared destiny with their company. For example, Qiu in Auto-6 described the company situation at that time as workers and managers being in 'the same boat'. A worker in Auto-1 believed that team working enabled workers and managers to 'stick together'. Chen, a union official in Auto-2, did a survey about what concerned workers most a few days before my survey. He explained as below:

> Although workers were concerned to keep their jobs, most of them thought about company things such as product life cycle, the quality and market of new products. They understood that it would be meaningless to talk about their future if the company could not survive. Most of workers believed that our company would not ignore workers' interests (a union official in Auto-2).

However, managers may perceive workers' team spirit differently, as one manager put it:

> I feel that for most workers, the team means their own shop-floor production groups. The demarcation lines between management and workers are clear. I do not believe that workers think their general manager is working in the

'same team' with them.

When asked who benefited from team working, about two-fifth (39%) of workers thought they benefited, 34% of respondents pointed to the whole enterprise including workers and management, 10% mentioned management, 7% referred to team leaders and 10% answered 'not sure', as is shown in Table 7.2. This demonstrated that team working was a win-win strategy, at least at the time when I visited the company.

Table 7.2 Who Benefits from Team Working?

Workers	Whole enterprise	Management	Team leaders	Not sure
39%	34%	10%	7%	10%

Total N= 326

A majority (81%) of respondents said that team working gave them chances to talk about their jobs and make suggestions. A high proportion (79%) indicated that team working brought them new skills (see Table 7.3a).

Table 7.3a Views on Team Working Positive.

I believe that all managers and employees should be members of the same 'company team'	n=273	79%
Working in a team helps me feel like I am part of the company	n=271	85%
Working in a team gives me a say over how my job is done	n=272	81%
Team working has given me new job skill	n=280	79%

Table 7.3b View on Team Working Negative.

Working in a team is a way to get us to work hard	n=272	82%
Working in a team gets us all pressuring one another	n=271	76%

Besides their likes, workers also clearly indicated something they disliked about team working. As shown in Table 7.3b, eighty two per cent of respondents felt that team working was a means of making them work hard. One worker on a production line explained:

> It is a big challenge for the whole group to achieve 100 percent quality control and efficiency. We have to work much harder so that our group can meet the quality commitment of not producing, not passing and not using substandard products. We also have to work much harder so that our production quota can be achieved when a group member is ill or injured.

Seventy six percent of respondents complained they felt considerable pressure from other group members (Table 7.3b). A group leader told me:

> The 'production group management system' assesses a group as a whole according to the performance of the whole group. The incentive component of wages is directly associated with group performance. Sometimes, some members doing well show up or blame others. Those falling behind are often under tremendous pressure from their colleagues and have to speed up their work pace.

A worker in Auto-6 confirmed what the team leader said:

> You know, we have the promise of product quality. Any mistake not only affects the reputation of our group, but also the pay of our group. I really felt guilty when I once did something wrong.

The bottom-up control of team working such as peer pressure supplemented normal management control. Some workers regarded this practice as a new form of surveillance and control which combined peer pressure with traditional supervision. Ru gave his feelings about this side of traditional supervision:

> It is not easy being a production worker. The production manager applies disciplines to you and the work group leader looks at your work all the time. In addition, the managers who pass the production line frequently check the quality of your products and your equipment. I always worry what I may do wrong. I think that traditional surveillance is still working (in Auto-1).

How did workers view the change in the decision making process? Relevant statistical data are presented in Figure 7.2. In general, 62% of direct production workers and 57% of maintenance workers thought their influence in decision making had stayed the same or decreased, whilst half the group leaders had the same idea. It should be noted that as for workers who agreed that team working increased their influence in decision making, the real meaning about increases in decision making is that they get involved in finding problems, making suggestions and solving problems with supervision of their group leaders or production managers. This does not mean that workers were empowered to have a final say or they achieved self-management. A worker expressed this very clearly:

> Yes, I often express my ideas about problems occurring in production during group meetings and solve small problems by myself with the approval of my group leader. This does not mean I can do what I want. For example, I am told that I have the right to stop a production line if I find defects. In fact, I need to report the defects to a group leader first. If he or she cannot sort the problem out, he or she must report it to a production manager who can finally decide if the production line should be stopped. Now you understand how I am empowered.

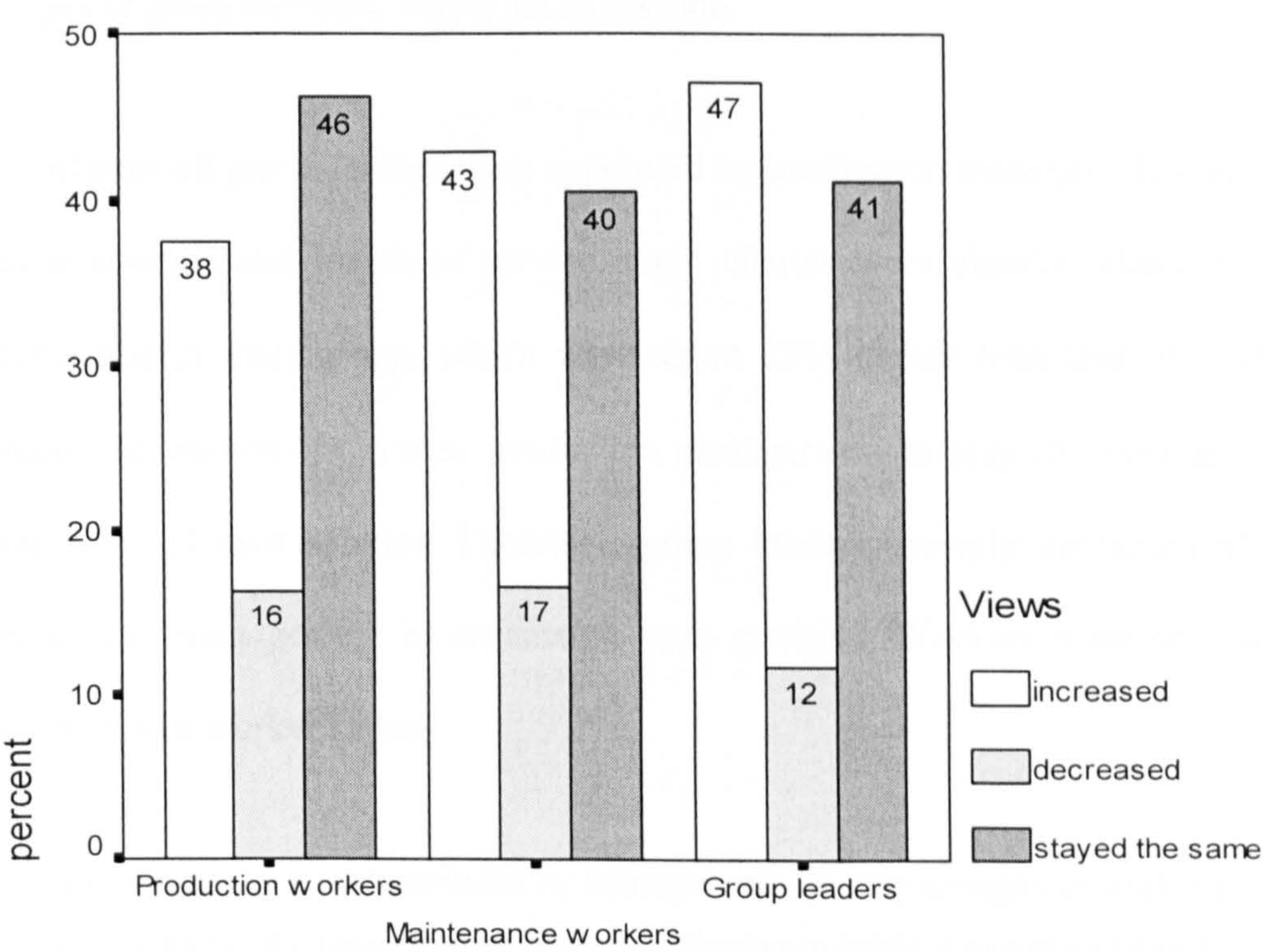
A worker in Auto-1 told me about his experiences in QCs activities:

> Empowerment? It is out of the question. Engineers play a key role in team working. They do ask workers whether there is anything that needs improving. Workers get clues from the engineer and make some suggestions. Nevertheless, engineers and project managers always have a final say.

A union chairman frankly told me:

> It seems that workers have been empowered in the firms with regular team working activities. In fact, workers have no right to make final decisions. There is a tendency now that in some firms team meetings are becoming formalistic and the team working is faltering. In some firms, QCs terms have not been set up so far. It will be great to achieve real self-management.

Figure 7.2 Workers' Views on Changes in Decision Making Processes by Job.



Total N=468

Figure 7.2 shows that 47% of group leaders felt an increase in their decision making process. This proportion is higher than that (38%) of corresponding direct production workers. This fact indicates that group leaders were key figures in team working. Group leaders were members of shop floor production groups and had managerial responsibility for immediate production activities. A group leader told me:

> I have been a group leader for more than 10 years. Before the application of lean production, I worked as a normal worker and occasionally attended some meetings held by managers. But now I have a lot of duties that were normally carried out by managers or other staff. I spend only half my time working as an operator on the production line. I have to spend the rest of my working time training new workers, filling in for absentees and doing paper work, such as filling out quality check sheets and making daily productivity reports. Sometimes, I have to assign tasks to production workers, take responsibility for quality control of my group and make suggestions about the performance pay of group members. This is not an easy job.

Almost all group leaders were appointed by production managers. In addition to their position and length of service, their salaries were closely related to the performance of their group, which were about 20% higher than that of normal workers. Suggestions from their production managers might play an important role in the scale of their salaries. Therefore, group leaders strongly implemented the intentions of management in organising team working. Workers were not happy about that, as a worker stated:

> Our group leader was appointed by management. He may change our work on a daily basis. We have to work harder and harder to achieve newer and newer goals. I do not like him. He is an agent of the management.

Most respondents (76%) thought that group leaders should be elected by their members and should represent their interests. In SAIC, the union is quite weak. It may take a long time for group leaders to represent their members' interests.

In summary, managers in the auto components companies have utilised team working to achieve the company's goals and to beat the competition. Team working did promote team spirit and enable workers to make their suggestions although workers are far from empowerment and self-management. In the next section, I will analyse how managers utilised Kaizen to cut costs and continuously harness workers knowledge for further development.

7.2 Kaizen

7.2.1 What is Kaizen?

Kaizen, the Japanese name for continuous improvement, is a philosophy that seeks unceasing improvement at all levels. It is not only a technique supporting TQM or JIT, where work-in-progress inventories, defects and non-value added operations are identified as targets for improvement; it is also a strategy dealing with cost reduction and productivity improvement. The Kaizen process can draw on any management tool including suggestion schemes, small group problem-solving, brainstorming or work study (Malloch, 1997: 107).

Sengenberger and Campbell (1993) view Kaizen as one of the principal features of lean production. Indeed, for them the objectives of lean production and many Kaizen programmes are identical: the avoidance of waste (cited in Malloch,

1997: 109). At the same time, continuous improvement is required because lean production has a customer orientation. Continuously changing customer needs and generally rising standards make Kaizen necessary.

According to the advocates of lean production, Kaizen harnesses workers' know-how, democratises Taylorism, synthesises manual and intellectual labour, induces an empowered workforce to participate voluntarily in the continuous improvement of operations, and generates job satisfaction and commitment (cited in Rinehart *et al.*, 1997: 153). However, Rinehart *et al.* contradict this view and argue that the process of Kaizen does constitute a departure from Taylorism, but the outcomes of the process generally conform to Taylorist dictates (Rinehart *et al.*, 1997: 155). Furthermore, Kaizen is held as central to both physical and intellectual exploitation, Kaizen is merely a means for constantly increasing the pace and intensity of work (Dassbach, 1996: 29).

In the following section, I will analyse how management in the auto components companies in SAIC promotes Kaizen and how Kaizen is organised to utilise workers' knowledge. Furthermore, I try to answer two questions. Does Kaizen give workers more power? Does Kaizen increase the workloads and pressure on workers?

7.2.2 The Origins of Kaizen in SAIC

The idea of continuous improvement was firstly launched in SAIC in 1995 with the absence of any mention of Kaizen. SVW practised KVP[2], which had been

advocated in Volkswagen Germany. KVP^2 means rapidly continuous improvement to compare with the system of Japanese Kaizen. KVP^2 emphasises improvements in flow, quality, service and price. In 1995, SVW organised 40 groups and successfully improved 146 items. It saved RMB 1.744 million. Despite its success, the experience of SVW had attracted relatively little attention in SAIC. This was because managers in other firms were eager to learn new lean production systems and it was too early to talk about continuous improvement.

Kaizen as a systematised approach did not appear until 1996 when a Japan company offered its joint-venture company (Auto-10) in Shanghai consultation on production management by adopting Kaizen within a three year period. Managers and workers were instructed in the philosophy of Kaizen by Japanese experts. The method involves seeking gradual improvement forever and to develop a consistent process--oriented way of thinking. Kaizen contributes to the full utilisation of labour. Kaizen was organised on some shop floors where the production layout was rearranged up to five times. A standard work-study was carried out several times. In combination with suggestion making, Kaizen won the workers involvement. At the end of 1998, the labour force of Auto-10 decreased from 333 direct production workers to 213. The company avoided adding an additional 83 workers to the labour force and saved RMB14.56 million.

Kaizen in Auto-10 attracted great attention amongst the top management of SAIC, who attributed its implementation to environmental pressures. In 1998, more and more acute competition occurred in the whole car and components market. The competition came from a few large automotive enterprises which manufactured

high quality products through setting up joint-ventures with foreign companies and some small enterprises which produced low price components. In 1998, SAIC suffered a decline in prices and a reduction in profit (from RMB 7 to 5.5 million). The only way to secure profits was to cut costs because customers demanded products with high quality and low price. Top management in the SAIC headquarters learnt lessons from joint-venture enterprises--SVW and Auto-10, and decided to diffuse Kaizen amongst the whole group.

7.2.3 Kaizen Practices

Kaizen in SAIC has three main practices: firstly, to instil into workers the idea of constant improvement and draw suggestions which focus on cost reductions; secondly, to adopt or renew standard operations which provides the basis for cost cutting by saving labour; finally, to break down the savings targets for workers.

7.2.3.1 Suggestion Making

The suggestion making of Kaizen has two features. First, Kaizen is always tied to concrete cost reductions. Second, the suggestion makers are expected to have the ideology of continuous improvement. The management in the auto components companies tried to make all employees exhibit the Kaizen ideology-- there was not an end and everything could be done better--to gain momentum in the development of the enterprise. Every individual was spurred to find better ways of doing his or her job to improve company operations. During my fieldwork, workers told me what they thought about Kaizen:

'Kaizen is to seek for a new starting line every day and to do everything better than what has been stipulated' (Zhong in Auto-1).

'Kaizen is to consistently add pressure to myself', 'Kaizen starts from my job' (Tang in Auto-2).

'Kaizen does not let me ignore small improvements' (Ru in Auto-3).

'We use brainstorming in the meetings to encourage people to come up with ideas in the Kaizen groups' (Qiu in Auto-6).

Kaizen was used by management to further extract workers' intelligence and knowledge because operators were familiar with the functions of machine and operation processes. The suggestions that came from workers were seen as evidence of workers participating in a further level of capital and labour utilisation. Most proposals were concerned about savings in materials and supplies or improving the efficiency of machines and tools. In the period 1998 to 1999, SVW adopted 644 suggestions and implemented 518 so as to save RMB 8.8 million. During the same period, Auto-5 had drawn 575 suggestions from employees and adopted 240 items resulting in savings of RMB 3.2 million. During the first two months of 1999, a workshop in Auto-3 yielded 31 suggestions.

The workers of Auto-1 can make suggestions once they find a way towards improvement. Each production group is also expected to submit at least two suggestions with high quality twice a year. As an example, 31 members who produce covers for gears in this firm have submitted 75 proposals and the adoption rate has been 100% since Kaizen has been implemented. The main innovation was to re-assemble an imported second hand machine and make parts instead of

importing parts. This saved $15,000 alone. An assembler in Auto-3 suggested buying grinding / milling cutters rather than buying single-function cutters for a saving of RMB 100,000 a year. Workers on one shop floor of Auto-4 submitted at least one suggestion every month. For example, a worker designed a device which showed great technical sophistication and made for greater efficiency. The most recent Kaizen project in Auto-2 was carried out to manufacture components for SGM and new products for the B5 car, SVW, which led to savings of DK 9 million.

Compared with early suggestion programmes within team working, the emphasis of Kaizen is on the quality of proposals instead of the number of proposals. The reason is simple. Previous efforts at team working have made progresses for several years but increased the difficulties of continuous innovation. A manager explained:

> In the early team working, workers searched for other people's visible weaknesses. Now we are requiring workers to find the problems in their own jobs. For example, a worker normally operates his machine according to a computer programme without a doubt. Now, he has to think how to improve his job and even to change the programme.

A worker indicated a little difference between Kaizen and team working:

> Each individual from the top manager to worker on the production line participates in Kaizen in various ways. Suggestions are submitted not only from project team members, but also from non-team members. The principle of Kaizen places an emphasis on incremental improvements and team working focuses on a collective co-operative spirit.

There are material and non-material incentives towards workers' suggestions although they are less than the value of the workers' efforts. When a suggestion is adopted in Auto-1, the production group receives a RMB 500 bonus and the individual worker who made suggestion gets RMB 500. Every participant receives a small gift like a hand towel. RMB 100 is awarded to a successful proposal maker in the Auto-4. Over several years, Auto-5 gave RMB 100,000 to the most outstanding suggestion submitters. In addition, workers were rewarded by non-material incentives. Miao stated:

> The taking of rewards and the presentation ceremony itself were valued highly by workers. An official announcement of the results of the suggestion scheme is published in the evaluation results table and in the enterprise newspaper. When our top manager phoned workers to congratulate them on the implementation of their good suggestions, workers were happy with this (a party secretary of workshop in Auto-4).

7.2.3.2 Labour Saving

Labour saving activity is invoked by a top management policy 'to cut 5% of the expenditure on three items (financial, management and sales costs)'. Middle managers monitor labour saving performances. The central concern of management is to eliminate slack in the system. The management in Auto-1 has tried to remove wasted human effort through systematic work analysis. Wang told how Kaizen was running:

> The moment we applied one-piece flow, the production system was in-balance. However, when we ran Kaizen, we tried to break this balance. You know, some workers do not like to do more work. I have to seek out a possible route to further increase their work pace. Every time, an adoption of a new

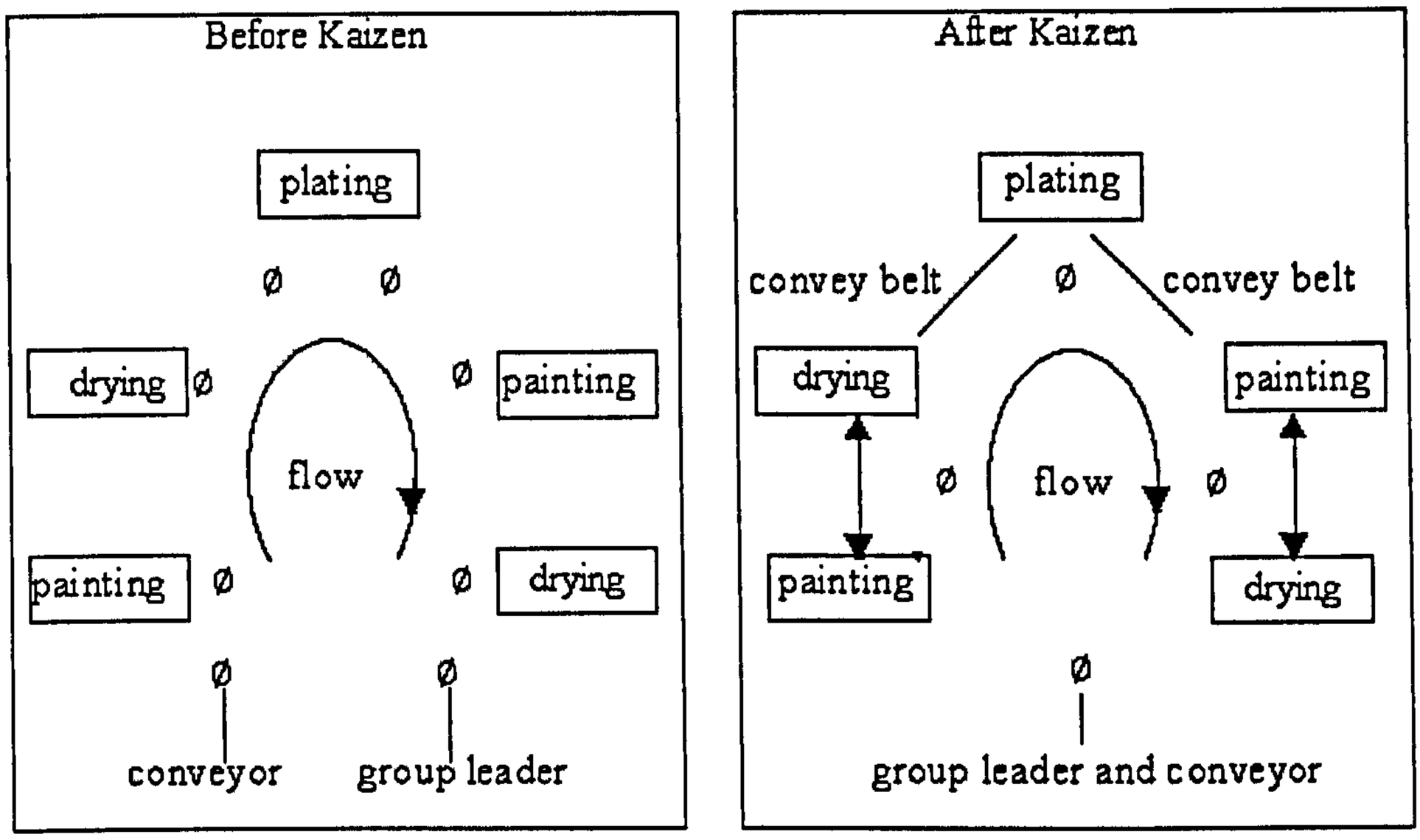
> design means an increase in the workload of workers, this will go on and on. You know, we can cut labour costs for about RMB 50,000 a year if we just save one person (the head of the manufacturing department in Auto-1).

This was not an isolated case. To utilise machines and workers to the maximum, some firms continuously improved the standardised method of working by restructuring the layout of machines and by recalculating the work pace again. This was imposed with little or no consultation, particularly in respect of the frequent adjustments in line balancing. I observed a shop floor in a firm in order to see what Kaizen was really about. A work group leader told me that the process of Kaizen was described on the notice board. Figure 7.3 shows the Kaizen results. Figure 7.3 clearly shows that Kaizen led to an intensification of the labour process, because works were added every time when the line was re-balanced. This did not permit workers 'the freedom to control one's work' (Womack *et al.*, 1990: 14). As an operator said:

> I feel exhausted when I go home every day. How hard must I work? Did management claim that Kaizen would be concerned about the human side?

Without a doubt, management in most of the firms in which I conducted interviews claimed that workers were scared of this kind of Kaizen and showed their reluctance to follow the managements' intentions. The labour saved was used to create new production lines for the Buick car in SGM. During the period 1993 to 2000, the members of a work group in Auto-1 were cut from 26 to 19. Three people on an assembly line of Auto-4 were transferred to a new team. 14 operators out of 30 in a production group of Auto-5 were cut. The inevitability of these labour savings ensured a greater and greater intensity of work.

Figure 7.3 Kaizen Achievement in a One-Piece Flow Production Line.



Key: ø---an operator

Problem:

1. unbalanced work pace, wasting time.
2. long cycle time, up to 24 hours.

Kaizen aim:

1. to save labour, reduce cost.
2. to balance the work pace.

Kaizen:

1. to add two conveyor belts to save one person.
2. one person operates both machines of drying and painting, save two person.
3. group leader do convey job as well, save one person.
4. to adjust pace of drying and painting to fit to plating, forming a flow.
5. to reduce cycle time to four hours.

	before Kaizen	after Kaizen	changes
output	12/batch	16/batch	33% increase
operator	8	4	50% decrease
effective utilisation of working time	41%	77%	85% increase
defective rate	3%	0.4%	88% decrease

7.2.3.3 A Break-down of Savings Targets

Beside the increase in workloads, all employees experienced tension when they were assigned savings targets. The external cost-driven pressure is shifted to internal employees and is magnified through the use of a special measurement device. YT, a component company was injected with foreign capital from Thailand and carried out a management strategy 'to make every employee be a manager'. This means that each employee would operate as if he/she was a member of management. Its aim was to continually cut costs. Chen explained to me how the project should be run:

> First, all resources in the form of money are measured by a computer system. Secondly, the firm is treated as an internal market. All relationships amongst departments are relationships of business, service and contract. Thirdly, an IC card (intelligent card, an electronic credit card) for recording the usage of resources of the firm, is used by everyone to deal with production, turnover, distribution and consumption. All manufacturing costs on the shop floor (wages, depreciation equipment, water and electricity bills, consumption of material, low consumption goods and repair cost) are measured by individuals. The operators can easily know their balance from a computer (a head of department of information in YT).

This seems to heighten employees' responsibilities and accountabilities. However, the IC card added extreme pressure to employees. Individual performance is much strongly linked to his or her profit and balance sheet. Although some workers possibly get paid more when the more cost they saved, most workers were in danger to get less pay because it is not easy to save enough money. A worker said this system forced him to calculate costs very carefully and struggle to spend money to a minimum. Top management in SAIC called for all

employees to learn from the YT experience. Although a few firms I investigated did not use IC cards, the target of cost reduction was devolved down to the production group or individual. A worker complained that the pressure came down the line and it was at the bottom that the pressure was greatest. Beyond the shop floor, all other employees were under pressure. For example, in Auto-3, the staff in the market department intended to extend their market share because the cost might be decreased by 7% if the firm produced 2 million more suspension springs. The engineers tried to reduce the material in the spring factory. Dropping each spring weight about 0.02--0.24 kg means that RMB 400,000 might be saved. As the head of the planning department at this firm put it:

> The pressure of saving cost is associated with the pressure caused by the fear of job loss. Workers and staff understand more and more our decision. If our firm closes down, all employees will lose their jobs and then they will blame us for lacking responsibility.

As a union chairman Hua commented:

> You see, cutting cost is like twisting out water from a dry cloth--it was impossible, the worker's pressure is unimaginable.

7.2.4 Survey Results

My survey investigated the extent to which the workers had experienced Kaizen in different firms. Broadly, Kaizen involves employees in participation and suggestion making. In general, one out of every five respondents claimed that they experienced a lot of Kaizen activity, 63% some experience, 25% few and no experience. Table 7.4 lists the data obtained from nine components firms and indicates that workers

participation in Kaizen varies from one firm to another. Auto-1 tops the list with the highest rate (79%) of worker involvement, which is followed by Auto-4 (70%) and Auto-2 (69%). In contrast, workers in Auto-8 were the least likely to be involved in Kaizen. Although there may be many reasons for this, it is certain that in my survey sample Auto-8 was the only firm that manufactured buses and did not supply components for SVW and SGM. The quality and price of products did not get any feedback from the two joint-venture companies, so workers in Auto-8 had less pressure to conform to a continuous improvement programme.

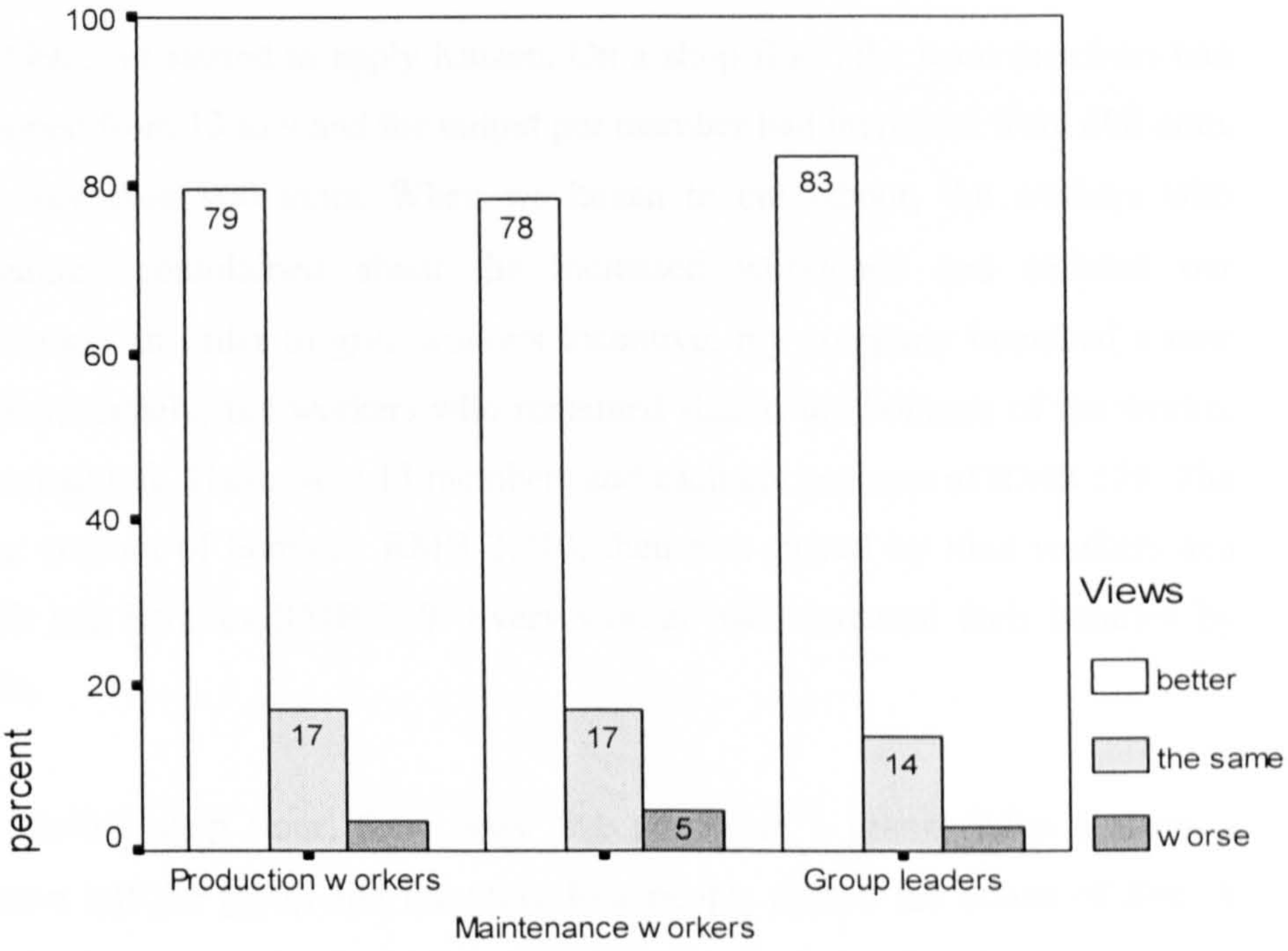
Table 7.4 Extent of Workers' Experience of Kaizen by Firm.

	A lot (%) (1)	Some (%) (2)	Little (%) (3)	None (%) (4)	Any (%) (1) + (2)
Auto-1	47	32	14	7	79
Auto-2	14	55	22	9	69
Auto-3	22	43	23	12	65
Auto-4	22	48	17	13	70
Auto-5	13	39	29	19	52
Auto-6	9	51	23	17	60
Auto-7	28	34	36	2	62
Auto-8	7	30	52	11	37
Auto-9	15	36	31	18	51

Total N=523

When asked the question 'how do you view the changes since your firm started to practise Kaizen', 79% said 'better', 17% said 'the same' and 4% said 'worse'. Figure 7.4 shows the views of production workers, maintenance workers and group leaders on Kaizen. The group views are broadly similar to each other. The views from different age groups reveal a similarity between them as well.

Figure 7.4 Workers' Views on Kaizen by job.



Total N=490

There are several ways to explain why workers felt better because of using Kaizen. Firstly, workers saw that Kaizen brought reductions in waste and savings in costs to improve the efficiency of the company and its competitive capacity. Secondly, Kaizen would be good for both companies and workers. Kaizen did bring workers economic benefits. The management adopted the policy of 'reducing labour without reducing bonuses in a production line or work group'. When labour was saved, the workers who remained shared the bonuses of the worker who had left. Thirdly, Kaizen provided chances for workers to think about production and development in the companies. The management thought it made sense to get workers involved. Finally, Kaizen might facilitate working smarter by means of

time and motion studies. The results of my interviews are consistent with the above analysis. Production manager Wu in Auto-10 said:

> In 1996, we started to apply Kaizen. On a shop floor, the team members had dropped from 13 to 9 and the output per member had increased from 800 units to more than 900 units. When we began to cut labour, the workers who remained complained about the increased workloads and resisted our decisions. In order to give workers incentive, my company launched a new policy, namely, the workers who remained shared the bonuses of the worker who had left. There were 13 members and each got bonuses of RMB 170. The sum amount of bonuses, RMB 2,210, then was shared by nine workers and each had bonuses RMB 250. Every worker had increased their bonuses by 48%.
>
> In another shop floor, there were five people in a group. After Kaizen, a person left the group and the other four people shared the bonus of five. A worker in a group that had not applied Kaizen asked me when his group would introduce Kaizen.

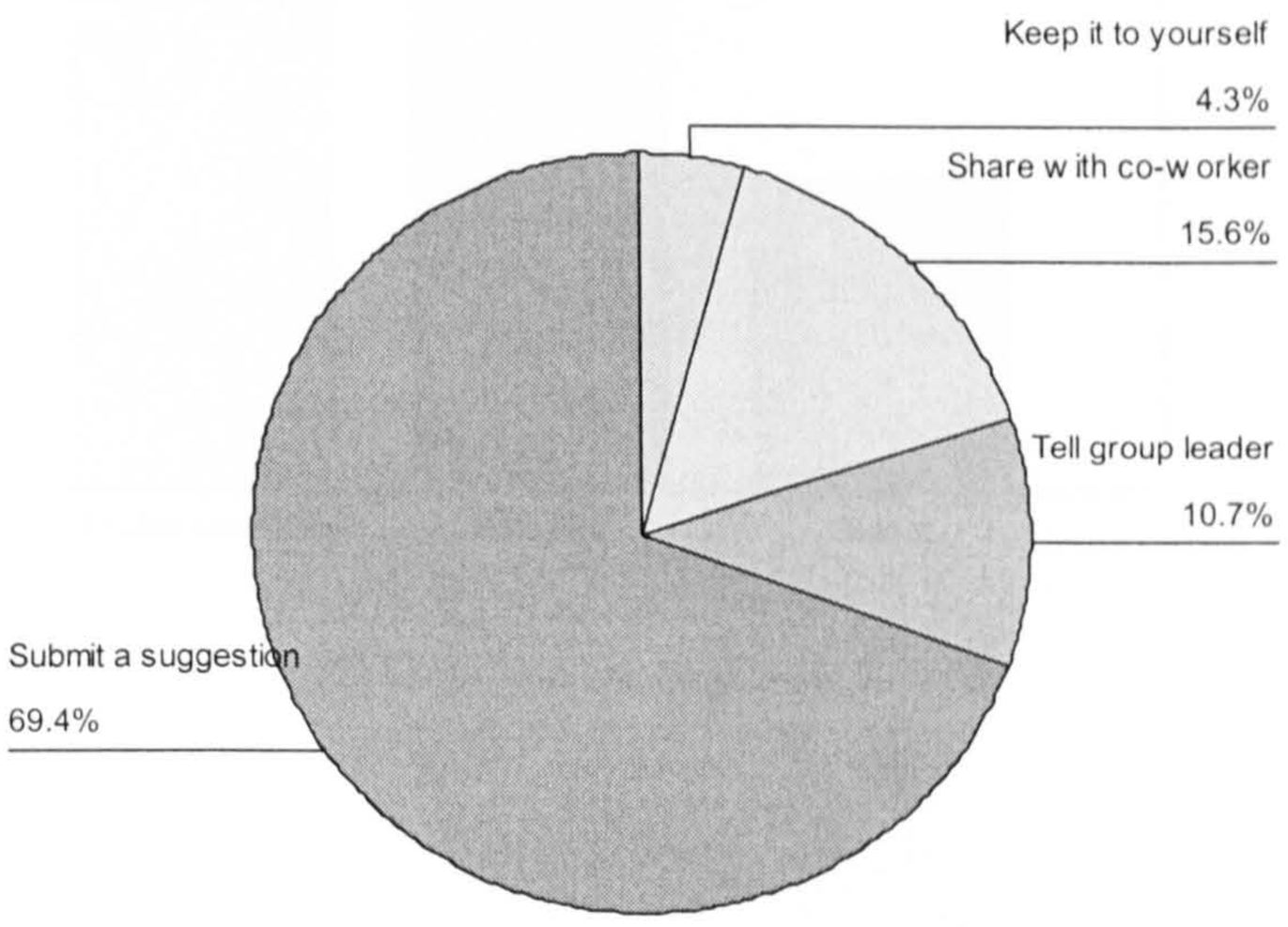
Workers started to realise that they benefited economically from the labour saving programme. It is worth noting that the workers' pay has increased since 1996 in general. The percentage of the wage accounted for by bonus and the amount of wage varied according to the economic performance of the individual company. For example, the average annual level of production workers wages in Auto-1 in 2000 was RMB 20,000, amongst them RMB 5,000 to RMB 10,000 were bonuses. It is clear that bonus is a means of giving workers incentive.

The workers' wages and living standards are higher than those of most people in Shanghai. The average wage of employees in state-owned firms in SAIC is about double the average wage of employees in other Shanghai SOEs. Workers in SAIC

also receive company welfare benefits which include old-age pension insurance and housing accumulation. Workers, however, were only partly reimbursed for their hard work. One assembly workshop in Auto-10 had saved labour costs RMB 6 million in 1997 and RMB 8 million in 1998. Workers' hard work contributed to the profit making of the company.

Workers were asked question 'if you find a way to do your job that is easier or faster than the standard one, what do you do?' A majority of respondents (70%) said that they would submit suggestions (see Figure 7.5). This was in line with management expectations. The respondents who wanted to tell co-workers (16%) were more than those who would share their ideas with group leaders (11%). The possible explanation is that some respondents disliked group leaders because group leaders helped management to intensify workload and enhance labour control.

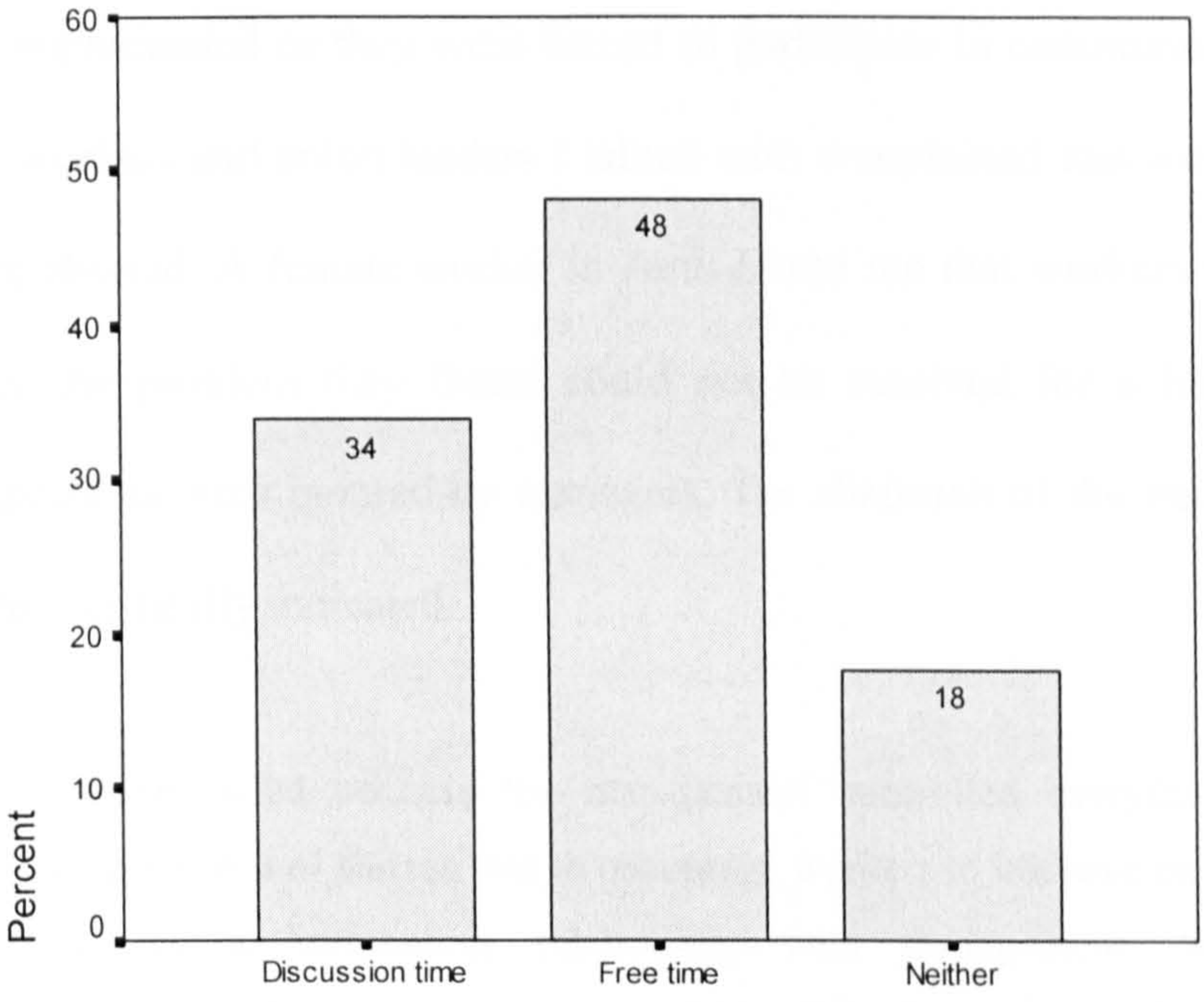
Figure 7.5 What Workers Would Do if They Find a Solution to a Problem?



Total N=532

Although workers would contribute ideas to their company, this did not mean that they were willing to sacrifice their own time for the company. When respondents were asked if they regarded their lunch breaks as their personal time or as a good time to discuss company's issues, approximate half the workers defined their lunch break as personal time and only one third of them regarded it as 'discussion time'. In fact, workers had to contribute their own time to their company. For example, production group meetings lasted one hour, half in the company time and half in workers' time. As for data collection and analysis in Kaizen, workers had to do them completely in their own time.

Figure 7.6 Views on Lunch Break Time.



Total N=504

The outcomes of Kaizen show that there was little evidence of worker empowerment and enrichment of the labour process. Firstly, production and engineering management took more extensive management prerogatives to gain full control of the Kaizen process. They not only managed re-organisation and job assignments, but also approved suggestions submitted from workers. This fits with the idea of 'Kaizen from above' (Helper, 1995: 271). Secondly, workers had no means of being involved in business decision-making. Workers did not play a central or independent role. Furthermore, workers made improvement partly because they concerned the future of their company and partly because they got bonus. Finally, the fact remains that not all workers were motivated. These workers initially endorsed Kaizen. They had an interest in cutting costs and making operations more efficient, but they were disappointed when their suggestions were not implemented or they were forced to participate in continuous improvement. A few workers and union leaders I talked with complained that workers' suggestions were aborted. A female worker in Auto-6 told me that workers were disappointed since the problem they found could not be resolved for a long time and their suggestions were ignored by managers. The chairman of the trade union Zhang in Auto-5 critically indicated:

> Kaizen failed because the management controlled everything here. The original idea of Kaizen was to encourage workers to improve on their own and develop a harmonious relationship with management. Workers were disappointed because there was a lack of funds to support innovations they suggested or management was not interested in listening to workers opinions and paid little attention to the problem on a timely basis.

From the managements' point of view, Kaizen practices are still far from perfect even in Auto-1 where workers experience in Kaizen tops the list of the firms I surveyed. One manager recalled:

> We failed to get a VD6.3 certificate (International Quality Standard, assessed by German experts) recently. One of the reasons was that the willingness of workers to implement continuous improvement was not high enough according to the inspectors' report (in No. 1 workshop in Auto-1).

In the other firm, a union official pointed out:

> To be honest, it was a very hard process to learn and apply Kaizen because we needed to change old practices formed in the planned economy. We made progress after several years' practice. However, it is hard to say that we did an excellent job on Kaizen. Kaizen is endless. We only achieved part of our goals. Long term improvement occurs in spirals.

Overall, Kaizen helped firms to cut costs, make greater efficiency and workers' fates were linked to this. Kaizen also encourage workers to make suggestions and enables worker to benefit them. These are the main reasons why Kaizen is still being carried out in the firms and why most workers felt Kaizen made things better. However, it should be noted that Kaizen inevitably intensifies the labour process. Kaizen was a method of work measurement. Like the traditional method, Kaizen tried to squeeze more and more work out of workers and save labour costs. Workers became more and more stressed as Kaizen targets became higher and higher. For the future, workers will have no easy way to make reductions in costs and will have to spend a lot of their own time to learn new knowledge and to contribute their know-how to management.

7.3 Training and Skill

Work organisational paradigms have a significant influence on training systems and skill structures. Debates about skills can be traced back to Braverman's *Labour and Monopoly Capital* (1974), which argues that deskilling and Taylorism is an inevitable feature of capitalist management. The new management paradigms have invoked an argument centred on the idea of a re-skilling process since the 1980s. Piore and Sabel (1984) indicate that the new technological market conditions require intellectual participation from workers with upgraded skills and greater autonomy. More recently, the arguments are about whether the lean production system creates a more skilled workforce. Womack *et al.* (1990: 101) suggest that the increased training prescribed in lean production provide workers with the skills they need to control their work environment. It is one of the supposed features of the break from Taylorism. However, there is also the argument that whilst multi-skilling is necessary to exploit arrangements such as JIT, variations or new responsibilities such as self-maintenance may be small and it is more accurate to speak of *multi-tasking* (cited in Thompson *et al.*, 1995: 721). Jacobs provides the evidence that the nature of training in the MACI (Michigan Automotive Compressor, Inc.) differs in significant ways from the promised scenario of empowerment and multi-skilling. The training for production workers is limited to memorisation of standardised, company-specific procedures for problem-solving (Jacobs, 1995: 322).

This section will provide a picture of actual training practices in SAIC in order to examine the congruence between lean production and the skill of workers,

to evaluate what real changes took place in the utilisation of skills. It will also explore the role of training in the process of adopting lean production. Such a study is based on analysing survey data and listening to workers' voices.

7.3.1 Training Agenda

Training was placed at the top of the management agenda in auto components companies at the initial stages of the introduction of lean production. Management was confronted with the fact that the quality of workers was not in accordance with the imported advanced techniques and management. Lean production was a totally new production form. Its application urgently required a well-educated and skilled workforce. Additionally, as a long-term strategy, an educated workforce would ultimately enhance productivity and competitiveness.

At the time I conducted fieldwork (1999-2000), the auto components companies were state-owned enterprises with a long history. These firms recruited workforces directly from high schools. This combined with the low levels of training due to a lack of dynamic and appropriate investment funds for training. As a result, an inadequate level of skill resources became a main barrier to the development of these companies.

Management was responsible for the training of employees whilst trade unions only participated in organising training. Managers paid attention to the training budget, experienced trainees and equipment. According to the '*SAIC Employees Training Registration Rule*', the training target is for 'at least 40 hours

(about five days) of training per worker annually, 60 hours per middle manager and 80 hours per top manager annually'. Some companies advocated '40+4' training system (working for 40 hours and training for 4 hours every week). Many training facilities provided individual training as part of the overall training programme.

7.3.2 Training Programme

7.3.2.1 Training for Lean Production Control

The emphasis in training shifted from the traditional apprenticeship system to meet the exigencies of the application of lean production. Concretely, what the training programmes covered was the spread of new knowledge and new technical learning to cope with the new production process, an understanding of the organisational changes and the revised management strategy. Without a doubt, training was the means to realise management control.

The spread of lean production knowledge was a necessity. Lean production consists of a full range of techniques of advanced manufacturing: one-piece flow, Kanban, cellular manufacturing, JIT and quality control systems. These new techniques were implicated in new forms of work organisation, such as team working and a continuous improvement environment. Each firm arranged for workers and engineers to be trained abroad. After planning, regimenting and implementing step by step, employees rapidly transferred knowledge learned from the classroom to real practices on the shop floor. Pan, the party secretary of No.3 workshop in Auto-1 believed that good management techniques could not be implemented without the training of workers. Workers needed more training before

they could do what they expected to do. Tang, a work group leader in Auto-4 recalled:

> Lots of training was necessary for lean production. The training was carried out twice per week. Each training session lasted for one hour. I was filled up with too many new things, and my brain was getting to its limits. I was nervous. I had to know and refresh these things.

In the newly constructed assembly workshop, only one flow line was installed. The changes had resulted in a high number of variants on one assembly line with which workers had to cope. Workers were trained to perform a wide variety of tasks, including simple machine repair, quality control, material ordering, and problem-solving. Each firm had its own training tasks. For example, Auto-1 trained every employee to have knowledge of quality standard QS-9000, VDA6.1 and VDA6.3. Auto-2 concentrated upon a system of quality assurance. The training results were visible, as Ru in Auto-3 put it:

> Trained workers are more likely to see defects at an early stage and to be capable of competent manual corrections.

Regarding the team working training, workers were trained to understand the following questions: what is team working? Why does the enterprise carry out team working? Why do workers benefit from team working? As production manager Chen in Auto-4 recalled:

> On the training course, I said team working was that every individual contributes his or her intelligence to attain company goals whilst considering other members new ideas and suggestions. When workers knew the other firms had team working, they asked me when they would start to do it. They

would not like to lag behind. You see, workers took the initiative on issues pertaining to the innovation. The shop floor created an environment for team working. Information was displayed on a board to show team members, projects and results.

Table 7.5 Production Group Leader Training Arrangement.

	Content	Hour	Lecturer sources	Resources of textbook
1	Enterprise management	144	University	<Management>
2	Production management	24	Planning dept.	SAIC <Lean production>
3	Team working	12	Planning dept.	SAIC <Lean production>
4	Special production zero	8	Quality dept.	Self-edition
5	Quality standards	40	Education dept.	Self-edition
6	Quality cycles	4	Quality dept.	Self-edition
7	Zero-defects activity	4	Quality dept.	Self-edition
8	6S	4	Planning dept.	Self-edition
9	Equipment management	12	Facility dept.	Self-edition
10	Cost management	24	Education dept.	<Cost management>
11	Car structure	32	Education dept.	<Car structure>
12	Writing	20	Education dept.	<Chinese>
13	Computer literature	120	Education dept.	<Computer application>
14	Visiting	40	Education dept.	Self-edition

Where training had taken place, team leaders or group leaders were more likely to be intensively trained and they were expected to train team members. They were first trained to understand the goal of application of lean production and the links to the individual and the contribution value to the companies' goals. The full-time training arrangement (which lasted three months) for production group leaders in Auto-2 in 1999, is shown in Table 7.5. It can be seen that team working constitutes a small proportion of this training--which is largely 'hard'.

The quality of workers, including group leader, influenced the extent on which they obtained the new management knowledge and techniques, as Wu, a production manager, indicated:

> The lower education levels of worker are impediments to the introduction of lean production. Our firm is not like a Japanese firm where most workers graduated from universities. Japanese workers were easily understood and implemented managers' demands. You know, I could not simply give an instruction. I needed to spend a lot of time explaining in detail to workers about how to do it. This is the difference.

7.3.2.2 Training for Flexibility

Functional flexibility refers to the ability to move workers from one task to another. Most employees at the workplace were formally trained to be able to do other jobs except their own. As discussed in Chapter 6, workers were trained to operate multi-tasking. According to the companies' requirements, all workers should be able to operate at least three machines. The operation of each machine should be learnt by at least three workers. This is called the two '1x3' projects. From 2000 onwards, SAIC began to implement the '315' training plan, which meant that 40% of workers should be competent in 3 technical skills, 20% in 5 technical skills and 10% for whole production line operation. Workers were trained to be adaptable.

Each sample firm had a '315' training plan. In the assembly line in Auto-6, 60% of operatives could operate three jobs, 20% knew five jobs and 10% were capable of operating on the whole line. In one group of Auto-4, 32% of group members knew three jobs and 5% knew 5 jobs. The flexibility showed that workers

were able to cover for absenteeism. The training methods were also flexible. Beyond any formal classroom training and special imported technology training, there was informal training by which workers learnt from each other.

Special flexible training was available for those workers who were asked to move to a new job since some companies sought to save labour. Workers preferred to be versatile rather than staying on one job. Common sense dictates that the more skills workers master then the more opportunities they have to keep their jobs. Shen in Auto-3 introduced:

> Due to labour saving, 200 to 300 workers and staff left their positions and are trained for new positions. They will be assigned new jobs after three months training.

The strategy of functional flexibility not only requires different skills from individual worker, it also impacts on the composition of the workforce. The higher the qualifications workers obtain the more easily workers keep their job. More and more workers studied at night school and then took external degrees through the local technical college on their own initiative and paid tuition fees by themselves. A worker in Auto-2 paid RMB 1,100 to be trained for a middle level technical certificate. Production group leader Xie of Auto-4 took pride in his team members, five youths out of 16 got polytechnic college certificates. Ru in Auto-3 gave another example:

> On our shop floor, 30% of workers graduated from middle technical schools after 1995 (12 persons) are receiving on-the-job training. They put in so much effort to gain a certificate from the polytechnic college. You know, they are almost exhausted on the job and they also had to work hard to pass

examinations. Workers' tuition fees can be paid by their company if they get the certificates. Otherwise, they will pay the fees by themselves.

7.3.3 Evaluation

My survey looked at what the training covered, the education level of workers, how training was related to the workers and workplace characteristics, and how workers viewed their skills. The data show that 20% of workers (non-managerial staff) graduated from colleges or universities and a majority received their education from high schools or middle-level polytechnic schools. The education level of workers is not high, although a few workers received certificates for on-the-job training. Even inside SAIC, workers in the state-owned firms had lower education levels than those in the joint-venture firms. For example, in Shanghai GM, 49% of employees (including workers) have certificates from colleges and universities.

The technical grades of workers in SAIC were slightly improved. From 1996 to 2000, the proportion of those at middle levels increased from 20% to 39%, the proportion of those at high levels grew from 2% to 6%, technicians from 1% to 1.5% and senior technicians from 0.03 to 0.14%.

I asked whether the workforce needed training to meet the technical requirements of their jobs. I asked 'how long does it normally take before new workers are able to do the job as well as more experienced workers already working here?' Most respondents (80%) answered 'more than one month', 8% were familiar with their jobs in a month and 12% would reach the required standard in two weeks.

Table 7.6 Duration of Job Training in SAIC.

More than 40 days (%)	31-40 days (%)	21-30 days (%)	11-20 days (%)	1-10 days (%)	None (%)
11	3	8	17	50	11

Total N=558

Table 7.7 Duration of Job Training in Britain and Turkey.

Percentages	10 days and more	5--<10 days	2--<5 days	1--<2 days	< one day	None
Workers in Turkey white-goods	3	9	16	22	43	6
WERS 98 employees in all manufacturing	8	7	15	9	7	53

Source: Nichols *et al.*, 2002: 77.

In general, workers were asked how many days formal training they had attended in the preceding twelve months (October 1999 to September 2000 in the case of SAIC). Table 7.6 shows the duration of job training in SAIC and Table 7.7 shows those experiences in Britain and Turkey. Within British WERS 98 (Workplace Employee Relations Survey) data, employees in British manufacturing sample are considered as a whole. Comparing the two tables, it is found that 94% of employees in Turkey white-goods had received some training. The proportion is only a little higher than workers in SAIC (89%) but more than for British manufacturing employees (47%). Workers in SAIC (39%) were more likely to receive intensive training (more than ten days) than those of Turkish (3%) and British (8%).

This proportion varied considerably across the surveyed firms. It was found that intensive training took place in Auto-1. 27% of respondents in Auto-1 attended more than 40 days training whilst the average percentage was 11% and only 3% of respondents had not received training compared with 11% on average. In contrast, 56% of respondents in the non-component firms were never trained in the period of one year.

Table 7.8 Training as a Source of Management Knowledge.

Kaizen (%)	LP* (%)	QCs (%)	Team (%)	JIT (%)	BPR (%)	FP* (%)	TQM (%)	HRM (%)
43	53	42	40	32	34	34	100	38

Note: LP*=lean production, FP*=flexible production Total N=582

The systematic training of workers prepared them for lean production by introducing both soft skills and hard skills. A number of workers learnt about new management practices by training. When I asked 'how do you know about the nine listed management techniques', on average, 46% of respondents referred to training. The details are shown in Table 7.8. For example, training was the best resource for workers to learn about team working. My survey shows that 40% of respondents knew team working from training, compared to 37% from practice and 6% from the mass media. The survey results also reflected the company's practices. Quality management was the most important skill in daily work, 100% of respondents had received TQM training. Many workers mentioned that training was also provided in the following areas: health and safety, group leadership, computer skills and law.

Table 7.9 shows the link between training and increases in skills by three job categories. There were no obvious differences amongst them. Only 3% of production workers were more likely to be trained than group leaders over ten days. Similarly, just 8% of group leaders claimed their skills had increased more than maintenance workers. Maintenance workers were more satisfied with skill improvement than others.

Table 7.9 Training, Skill and Satisfaction by Job.

	Production worker (%)	Maintenance worker (%)	Group leader (%)	Total N (%)
More than 10 days training	40	34	37	514 (39%)
Skills increased	63	68	76	489 (64%)
Satisfied with skill improvement	68	77	73	510 (69%)

Table 7.10 Training, Skill and Satisfaction by Age Group.

	Under 31 (%)	31--40 (%)	Older than 40 (%)	Total N (%)
More than 10 days training	37	39	40	528 (39%)
Skill increased	64	63	64	502 (64%)
Satisfied with skill improvement	58	73	77	530 (69%)

Taking age into account, I found that workers in different age groups had almost the same likelihood of receiving more than ten days training and reporting increases in skill levels. But, the older the workers the more they were satisfied with training, as Table 7.10 represents. It is perhaps understandable that older

workers might make a comparison with the past when their skills were at a lower level. Younger workers might have more expectation to improve skills.

SAIC has incorporated a concern for training within the overall production process. According to the chairman of the trade union in SAIC, SAIC had provided 11,053 training places for workers for five years. Most employees knew about lean production whilst few managers had heard about it in the other industries. Recently, top management in SAIC put forward a proposal to be carried out called a 'learning organisation' activity. Its underlying principle is team learning and life-time learning to affect the transition from firms based learning to organisational based learning. Employees are required to improve their abilities to learn and to experience continuous learning. Firms are expected to be a knowledge-intensive environment. It is, however, a long way from achieving its goal.

7.4 Summary

My research finding indicates that the auto components companies in SAIC have adopted a lean production related work organisation. All organisations are at different stages in this process of change. Most workers had experience of team working. Team working like QCs provided an opportunity for workers to participate in improvements of product quality and innovation. It is, however, far from the ideal that workers in self-managing team design their own jobs. The production group management is a kind of form of team working. Essentially, team working in SAIC invoked some cohesion with the Japanese approach to labour regulation and control.

Management in the auto components companies has applied Kaizen to utilise workers intelligence and to eliminate waste. Workers were encouraged to contribute their ideas about improving their work. Kaizen helped firms to cut costs and to increase competitive capacities. These were viewed favourably--not least because of the economic benefits from the workers who left their jobs. On the other hand, workers' ideas were not the dominant influence on the organisation of work, their Kaizen suggestions must be approved by engineers or managers. In addition, Kaizen was also a means for constantly increasing the intensity of work and made workers very stressed. This was viewed unfavourably by the workforce.

Management had carried out training to assist lean production controls. Special flexible training was available for those workers who were asked to move to a new job following labour saving. Although workers reported that the training had increased their skill level and made them feel better, this does not mean lean production leads to multi-skilling because the workforce is still largely semi-skilled now.

It is clear that work organisation in SAIC is in transition. Market pressures have galvanised the company into introducing team working, Kaizen and intensive training. However, global competitive pressures still challenge management to introduce further modern management techniques.

In the next chapter, I shall analyse the role of the trade unions in the process of applying lean production.

Chapter Eight

The Role of the Trade Unions

The role and significance of trade unions under lean production environments have been widely debated. Critics argue that, because of the 'fragile' nature of the lean production system, trade unions should forge an identity independent of the company and to address problems of labour control within the labour process by strategically challenging the outcomes of lean production (Rinehart *et al.*, 1996; Stewart and Martinez Lucio, 1998; Upchurch and Danford, 2001). Unions are relegated to a minor role in involvement with management and are seen as being weak in protecting workers' interests. Views about the union helplessness come from both sides of the debate. Womack *et al.* disregard unions because they claim there is no need for them. By contrast, critics point out that enterprise unionism leaves workers without an effective collective force to challenge management prerogatives and demands (Clarke, 1990; Dohse, 1985).

There is a lack of research on the trade unions' roles under lean production in China. This chapter, therefore, has three objectives. The first objective is to examine the changing unions' roles at national level and unions' involvement in lean production at the workplace level. The second objective is to scrutinise if unions can maintain fair pay and secure jobs for workers. The third objective is to examine workers' views on the role of the trade unions by looking at the possibility of building strong independent unions to represent the interests of workers in enterprises that have adopted lean production.

8.1 Trade Unions at the National and Enterprise Level

8.1.1 The Changing Trade Unions at the National Level

The traditional role of the Chinese trade unions has been as 'transmission-belts' between the Party and the 'masses' since 1949 (Ding *et al.*, 2002). The industrial relations normally involved a triangular relation between the state, employers and the trade unions (Warner, 2002: 390). Before the economic reform, when workers were called the 'masters' of the country, they and management were held to have had the same interests. In line with this, the union have a legacy of co-operation with management and government.

The Trade unions had been organised on vertical lines. The All-China Federation of Trade Unions (ACFTU) has remained the apex organisation which integrates the constituent parts. There have been 15 major industrial unions and 31 provincial trade union councils in recent years. They have over 103 million members in more than 586,000 primary trade union organisations (Ding *et al.*, 2002: 433). In general, the average level of unionisation in state-owned enterprises is probably around 90%, but in JVs (joint-venture enterprises) and FEEs (foreign-funded enterprises) it is generally much lower. Since the 1980s, the role of enterprise unions has become weaker as the role of the Party at the local level began to weaken in the enterprise (Ding *et al.*, 2002: 434).

The Chinese economic reforms, resulting in the dissolution of the socialist safety net for workers, have had fundamental implications for the nature of management-labour relations (Mok and He, 1999). Since 1992, the reforms of three

systems (the labour and personnel system, the wages system and the social insurance system) have caused a decline in workers status as a whole (Feng, 1996; Mok and He, 1999). This is reflected most markedly in reductions in real incomes, welfare benefits and job security. Workers in those enterprises suffered financial difficulty whilst workers lost their job in those enterprises which were bankrupted or merged.

With the development of the market economy, the contradiction between managers and employees is growing at the enterprise level. On the one hand, managers pay more attention to making profits, so they look for some ways to achieve it, such as reducing employees or increasing workloads. On the other hand, employees would like to maintain their own interests, and they hope to have a steady job and to be fairly treated. The number of labour disputes has increased, although workers do not have the right to strike like in the Western countries.

A new Labour Law was passed by the National People's Congress in 1994 and the trade unions have requested a more important role in readjusting employment relations and the All-China Federation of Trade Unions (ACFTU) recognised the need to be an independent force acting on behalf of employees. A degree of bargaining has been introduced via collective contract, a means affecting some SOEs managers and private-sector employers to handle their personnel decision on downsizing and lay-off, pay freezes and wage cuts and the like with greater care and even greater restraint (Warner, 2002: 391).

The trade unions in the auto components companies in SAIC, like many unions in other companies, are realising the importance of protecting workers' interests but they are facing problems to make changes. In the next section, an examination will be made as to what the trade unions in SAIC did during the period of implementation of lean production. The evidence collected on the union's role in SAIC is consistent with the overall pattern.

8.1.2 What the Trade Unions Do in the Auto Components Companies

8.1.2.1. Supporting Lean Production

In these auto components companies, the union officials had a tradition of working with management, they and the Party chose to adopt new management techniques. As discussed in the previous chapters, management paid more attention to the issue of employee involvement and employee commitment when lean production was emulated. Management hoped that the trade unions would make the application of lean production possible because the efficiency and prosperity of the company would benefit employees. As the deputy head of the manufacturing department in Auto-3 put it:

> The union supports lean production because it represents workers interests which we are taking care of. You see, we and the union have the same objective. The union leaders join the 'Lean Production Leading Group' in our firm (who graduated from a university and in his early 30s).

It is pretty clear that the union was in management's pocket. The trade union chairman Wang in Auto-1 expressed the same opinion:

The enterprise development is a big thing we need to consider. What our union officials do is to strive for the enterprises' central goal. We have participated in the introduction of lean production. We try to strengthen the cohesion of workers and to encourage workers to utilise modern technology and work practices. The union helps to implement lean production by ensuring the workers are subject to appropriate propaganda.

The union mostly gets involved through team working-production group management. As a female union official, in her 40s, in Auto-3 said:

> The union launched a campaign to be an 'excellent group' *(you xiu ban zhu)* and 'flag group' *(hong qi ban zhu)*. The union documented a standard which was in line with the requirements of lean production, including JIT production, quality control, equipment maintenance and cost reduction.

Yang, who was in charge of production group management in the union headquarters in SAIC told me how union officials checked out production groups:

> The union officials often go to the shop floor to check on the following: (1) whether production groups follow the rules. (2) Whether there is an atmosphere of lean production, i.e. a blackboard bulletin which shows what the groups do. (3) Whether groups keep all records of team working. (4) Whether groups carry out team working. At the beginning of the application of 6S, it was difficult for workers to keep doing cleaning. Some workers only cleared the floor for the checking. The union officials went to the shop floor again and again until workers had good behaviour patterns.

As discussed in Chapter 7, workers contributed many suggestions to management. It is worth noting that the union officials have made strenuous efforts to encourage workers to participate in the activities. Most firms have regular activities. For example, Auto-1 organises suggestion making in March and

September. Another union function was to organise the training of employee and production group leaders.

When the unions participated in production group management, the union officials appeared to their members as part of management. The union chairman Chai in Auto-2 saw some uncooperative workers as a hindrance to the implementation of management's ideas for improvements in productivity:

> We have taken pains to apply lean production for six years. The biggest obstacle is the old customs of workers. Although management stipulated a lot of rules, workers would not strictly follow them if there was nobody to check them. Our union officials felt tired because we had to check three times in a month. Now workers have become accustomed to the new work practices. But the quality of workers still needs to be improved.

This 'we' used by Chai is significant. It is 'we' who take pains to implement lean production, and 'workers' who have been the problem. Zhou gave an example how the union supported management when a worker went absent:

> One operator in our assembly line was always absent without any reason. You know, each worker had a full workload and it was difficult to find someone to fit in. It caused chaos. A production manager gave this worker an official warning attempting to alter his behaviour. This did not work. The manager decided to ask the operator to leave his position. Then the worker was dissatisfied and looked for help from union. The union supported management. The worker left our assembly line and waited for a job.

However, when considering the unions' contribution, the union chairman Zhang in Auto-5 pointed out, bluntly, the minor role of the unions:

During the process of adopting lean production, management has played an important role. The union only assists management. For example, we were asked to accompany a person in the department of manufacturing to check out the shop floor for quality standards. Out role is subsidiary. It is undeniable that management exercises an important influence over the way in which the trade union participates in the application of lean production. It will be wrong that you believe the union plays an important role in the application of lean production.

8.1.2.2 Protecting Workers' Interests

When harmony, mutual benefit and commitment to company success feature prominently in management's view of employment relations, is it necessary for unions to protect workers' interests? When asked how the unions represented workers' interests, most union leaders mentioned a collective contract with management on behalf of workers and staff members. As one of the union leaders said:

> Normally, the trade union in our company signs a collective contract with the top manager, which draws up employee's wages, benefits, working conditions and production targets. This is an important role for the trade unions.

The workers' congress is still active. It has certain information and consultation powers but no real co-determination rights. As Zhou in Auto-5 suggested:

> The representative staff and workers' congress involve around 10% of the workforce as members. The congress in our company meets twice a year, but as a formality to discuss company policy, the previous year's performance and the plan for the next one. In theory, the major issues proposed by management will be endorsed by the congress. However, in fact, it does not take a direct

> part in managerial decision-making. It is not consulted or asked for a judgement on major issues (a group leader on an assembly line).

Most union officials mentioned training as an important channel to protect workers interests. The union's chairman Tang in the headquarters of SAIC explained his idea:

> During the process of auto industry development, we have persisted in the combination of 'interests of state, enterprise and employee' whilst serving of employees' interests. Training has been a driver of protecting employees' development rights including employment rights and labour rights. Training not only protects workers long term's interests but also contributes to the union role in economic development.

Although unions do not have an important influence in management decision-making, management does not enunciate a desire to avoid the union. This is the difference between China and the Western countries where management can express overtly their desire for an anti-union environment skewed toward corporate capitalism and against working class interests.

The introduction of new management methods has caused a variety of changes on the shop floor. Labour saving implied a change in some workers jobs. The change is forced and ruthless and workers were severely affected. The application of lean production does lead to more intense work and more work related stress. But, there is little evidence of unions resisting these changes although union officials are sympathetic to the situations of the workers.

The incidence of industrial conflict in Chinese enterprises is still a sensitive issue, and the unions tend to gloss over both its existence and frequency. Several union chairmen indicated that there was no link between the application of lean production and union militancy in defence of workers' interests. They explained that some disputes were not caused by implementing lean production. This remark was a common one and was echoed by some workers. For example, Fan in Auto-5 said there was no clash between management and the unions. Ru in Auto-3 shared the same view:

> There are no disputes over the application of lean production. Lean production is a good thing for workers. Management and workers have the same interests. Management treats workers right, and we don't need a union to speak for us.

In fact, labour disputes did occur. The workers' main complaints were the dramatic increases in the work pace. Most workers believed they tended to work under stress whilst most managers were much more relaxed. These complaints were expressed in the comments respondents made to open-ended questions on the questionnaires. One worker was unhappy with rigid demands from management. Another worker complained that management enjoyed benefits and workers suffered from hard work. However, workers did not attempt to complain for fear of losing their jobs or being shifted to lower paying service jobs, as one worker put it:

> I feel unfairly treated but have nobody to complain to. Even if I talk to management, they are unresponsive to the problem. In the worst case, I will be sacked. Some of my co-workers have opposed viewpoints to management on the reforms, but they are unable to express their opinions. We believe the unions are useless.

During the period of the research, union officials mentioned some forms of interest representation with regard to grievances and working conditions, but not with regard to work intensity. Chen admitted the union's difficulty:

> I have responsibility for labour disputes. The union has not matched the requirements of the workers, namely, the union should not only have a good relationship with management but should also really represent the workers' interests. Some middle managers act as bosses to ask workers to do as they want, otherwise workers will risk the loss of their jobs. In the respect of workloads and work pace, workers are treated unfairly. We feel unable to cope with these problems.

It is said that making profits is protecting worker's interests greatly. Trade unions have changed from fully following the management's will to protecting both the whole enterprises' interests and the individual interests of workers, but it is a very difficult thing. The trade union will lose its significance if it can't do something for workers (a union official in Auto-2).

Union leaders complained that management policy made it impossible for unions to co-determine important corporate decisions, including product pricing and financial issues. In some cases managers saw the union as having no power at all, management had an indifferent attitude and ignored them. The union was perceived as too weak to be taken seriously. Zhang in Auto-5 expressed his helplessness:

> The union has no rights to influence management's decisions because the union is under the leadership of the Party whose power to limit management has declined. The role of party organisations in enterprises has been reduced to only a 'political leadership', and their power over both enterprise management and workers is weakened (the union chairman in Auto-5).

The union Chairman Wang added:

> If we have a proposal, we need to report to the party first. We will fail if the party does not approve it (in Auto-1).

It is argued that in some circumstance in the UK the role of unions might depend on the personal courage and ability of the union chairman to negotiate with management in the decision-making process (Alderton, 1998). In a joint-venture firm of SAIC, I was told that the union did speak for workers. A union official Wang told me about an incident:

> A worker believed that the work was too hard and that the management's work pace was too relaxed. When he spotted a defective item he refused to pick it up because he thought the quality inspect official should check it out. Unfortunately, the defective item was missed by the inspector and was found by SVW. This caused an assembly line stop for 2 hours and the assembling of 60 cars was delayed. Management would dismiss this worker due to causing an accident. Our union chairman Gao kept this worker and punished him rather than dismissed him because the inspector should share accountability for accident.

In the next sector, we will discuss workers' views on their pay. It will be seen that half the workers who satisfied with their pay are increasingly depending on management, rather than unions. Another half the workers who received their unfair pay complained that unions were weak in protecting their interests.

8.2 Workers' Views on their Pay and Welfare

8.2.1 Workers' Pay and Welfare

Management at the headquarters of SAIC held promise for workers--a promise of a win-win outcome at the beginning of introducing lean production, namely

management got high productivity and high profits whilst workers got good pay and welfare benefits. According to a report of the chairman of the board of SAIC, employees' wages were at the higher municipal level in 1998. The average pay in SAIC was RMB 26,872, which was RMB 1,895 over the previous year and increased by 8%. As for state-owned firms in SAIC, it was RMB 22,478, which increased by RMB 1,278 (or 6%). However, the average wage of employees in Shanghai was RMB 11,918, which was RMB 494 over the previous year and increased by 4% (Speech by the chairman of board at the Employees Representative Congress of SAIC in 1999).

The basic payment structure is the 'post + performance + seniority (*gang wei + xiao yi + gong lin*)'. There are 26 job grades in SAIC. Top management reaches the highest grade--26. Whilst middle management starts from grade 15, and the grade of lower management ranges from 8 to 18. Workers start on grade 1 and they will progress to grade 15, which is normally filled by senior technicians and group leaders. Small differences appear in the lower grades (for example, the pay difference between grade 2 to 3 is RMB 40). However, a big gap exists between higher grades.

What is the general pay level in the components companies? The average annual level of employees' wages in Auto-1 in 2000 was between RMB 30,000 to RMB 40,000, the average wage of production workers was RMB 20,000. In the same year, the median pay of employees in Auto-2 was about RMB 30,000 in which performance pay made up almost the same amount as basic pay did. Workers on the production line supplying the Passat car components to SVW had the highest

performance pay of up to RMB 1,800 monthly. In Auto-3, there was not much difference in pay levels but a slightly different method of payment. Ru talked about his pay:

> In our firm, all workers like me get 80% performance pay monthly, the remainder of 20% will be paid me if our firm completes its production targets fully. Otherwise, I will lose it. I earn RMB 1,000 performance pay in the total monthly salary of RMB 2,200. A young worker earns RMB 500 performance pay in the monthly salary of RMB 1,500 (a man who has 28 years service, supervising group leaders and is under the supervision of the production manager).

Whilst Auto-4 has the similar level of average annual pay, it is said that a group leader earns 20% more than production worker on average.

Table 8.1 Benefits and Welfare (Staff Member with More than 30 Years Service).

Subject	Items	Amount: RMB
A. Company paid benefits	Accommodation rental benefit	4
	Subsidised meal benefit	120
	Transport benefit	100
	Subsidised goods benefit	108
B. Company contribution to basic welfare (State stipulated)	Pension insurance	212
	Housing accumulation fund	165
	Medical insurance	30
	Unemployment insurance	40
C. Company contribution to supplementary welfare (Company welfare)	Pension insurance	110
	Housing accumulation fund	419

In SAIC, all employees have fringe benefits including an accommodation rental benefit, a subsidised meal benefit, transport benefit for employees who bought a company car (about 40% of employees in SAIC). The accommodation rental benefit is however very low, only RBM 4, because there is a fund for buying an apartment or a house. According to the state policy of social welfare reform, the company must pay for employees' basic old-age pension and housing accumulation fund. The longer the service is, the more the old-age pension an employee will receive. Table 8.1 shows the benefits according to a staff member who had more than 30 years service.

The top management in SAIC provide supplementary welfare because they recognise that improved welfare may have beneficial effects on economic performance in the longer term. In the above case, the supplementary welfare cost of RMB 529 is more than the cost of the basic welfare items issued in the wake of the government's new welfare scheme. The six items are contributory, with the individual paying a similar sum to the insurance company.

During the fieldwork, workers were asked how much they received in company welfare each month (sections B + C in Table 8.1). Ru who had 25 years service and supervised group leaders in Auto-3 gets about RMB 800. Xie, a group leader of Auto-4 was provided RMB 500. A worker in Auto-1 received RMB 400 monthly.

Until 1998, SAIC had provided supplementary old-age pension insurance contributions of RMB 240 million with, on average, each employee receiving an

employer's contribution to the retirement of RMB 9,980. SAIC paid a supplementary housing accumulation fund contribution of RMB 42.7 million. In addition, SAIC spent a supplementary benefit of RMB 12 million for 18,488 retired employees and RMB 2.9 million to alleviate the hardship of employees (a speech by the chairman of board at the Employees Representative Congress of SAIC in 1999). It was an excellent welfare scheme compared with those of most companies in Shanghai.

8.2.2 Management's Unilateral Determination on Pay and Welfare

The trade unions in the auto components companies are under pressure to maintain workers' fair payment and welfare because management unilateral determination has been the most important source of resentment in the workplace. Wang, the union chairman in Auto-1, complained because unions had no rights to negotiate wage levels, as is normally the case in the Western countries:

> The management determines pay and welfare level alone. They should discuss workers pay with the union. The union has a right to negotiate and to make plans for the growth of pay. Our firm has made lots of profits since we adopted lean production. But, workers have not received what they should get compared to their hard work. Our union leaves workers without an effective collective voice on the shop floor to change management decisions.

At the firm level, personnel managers decide basic pay. Production managers on the shop floor determine the performance pay of each work group depending on appraisal. In some cases, group leaders participate in giving appraisals to individual workers, as Yu elaborated:

We have six work groups with 132 people in our workshop. I am in charge of pay distribution in respect of performance. Each work group has a different total amount according to group outputs and product quality. Dispatches amongst individual workers are shown on a sheet. The mark I give is 50% of the total mark, the work group leader gives 40%, and the mark the 'assessment committee' gives contributes 10%. A worker can enquire about his or her pay. In some cases, a worker's pay rises. This is usually because he or she resolved a technical problem (a production manager of No. 1 workshop in Auto-1).

Most important, the individual performance related pay system was a useful aid for management control, as Pan introduced:

> Individualised pay systems enable management to reward co-operative workers (for example, who are listed in the top five on the management campaign table) and penalise uncooperative ones, including those who refuse dispatches or do not complete parts on time (a party secretary of No.3 workshop in Auto-1).

There have been a variety of ways to evaluate workers' performance at different companies. Although there is difference in the measure scale, workers' behaviour and work effort are assessed in seven areas in all firms, including quality management, cost management, production target, material flow management, equipment maintenance, safety and health, absenteeism (both in job and training). Workers who do not follow the rule will be deducted in their performance pay. Take Auto-2 as an example, it is stipulated:

(1) The worker who violates flow management rule will lose two grades in performance pay for a month.

(2) The worker who does not fill out quality check and equipment check sheet will lose two grades pay for a month, and a worker who does not fill data on time will lost one grade.

(3) The worker who does not place containers and appliances in correct position will lose one grade pay for a month.

(4) The worker who produces a defect or misses a defect will be taken off two grades performance pay for a month.

A handful of individuals who did not cooperate with management about speed-up or multi-tasking were fined. Four workers were withdrawn bonus because they refused to attend training. Every firm stresses the importance of quality in the work of each employee. The punishment occurs mostly in the case of producing defective products. In a workshop of Auto-1, RMB 50 to RMB 100 will be deducted once a worker makes a defective product. A worker who makes a batch of defective products will be at risk of layoff. There is deduction of RMB 20 to RMB 50 for each defect in Auto-4. In some firms, performance pay is related to the group's performance. The whole group of members will be punished if a defective produce left the workshop. A group leader in Auto-6 was cut bonuses for three months. A supervisor in Auto-3 was fined RMB 1,000 and left his position.

The welfare system of each company varies considerably. The supplementary welfare is linked to company profitability and to the individual's post and years of service. Disparities between workers in the different companies and between managers and workers in the same company may be a source of conflict.

8.2.3 How Workers View Their Pay and Welfare

Workers were asked if they were satisfied with their pay. In general, 2% and 42% of respondents respectively were very satisfied and satisfied with their pay. These results were also confirmed by interview. However, 51% and 6% of respondents seemed to be dissatisfied and very dissatisfied with their pay.

The answers to this question from workers with different backgrounds are analysed in order to examine the feelings individuals had about their pay (Table 8.2). It is found that workers without any college education were content with their pay; men were more likely to be happy about their pay than women. It is possible, but by no means certain, that men earned more than women simply because men worked in the heavier jobs. It is also possible that men were paid more than women.

In addition, statistical tests on the results (Table 8.2) suggest that about one third of work group leaders thought their pay was satisfactory. One possible explanation is that group leaders felt their pay to be unfair since they took on so much more responsibility. Four-fifths of group leaders reported that their job made them work very hard. It is worth noting that group leaders were still listed in the workers' category, their pay had certain limits and their leader subsidies were restricted. A group leader in Auto-1 did not think that his leader subsidy of RMB 60 monthly was fair in comparison with the management subsidy of about RMB several hundred monthly on average.

Table 8.2 Workers' Views on Their Pay by Different Backgrounds.

Unit: %

	Variable	Satisfied	Dissatisfied
Gender	Male	45	55
(n=544)	Female	39	61
Age group	<31	39	61
(n=535)	31--40	38	62
	>40	52	48
Education level	High school	45	55
(n=499)	College	35	65
	University	39	61
Job category	Production worker	45	55
(n=515)	Maintenance worker	45	55
	Group leader	32	68
Length of service	1--10 years	37	63
(n=491)	11--20 years	39	61
	21--30 years	53	47

The longer the service the more satisfaction workers felt with their pay. Workers who were over 40 years old and had above 20 years service were found to be most satisfied with their pay. This is confirmed by the result of Table 8.3, which only looks at production workers, and suggests that the older the production workers, the more satisfaction they felt with their pay. This may be explained by the possibility that older workers were more likely to make comparisons with the old days and feel more content with their present pay, as Shen in his 40s recalled:

I still remember the year 1980 when I first got a bonus of RMB 5 a month. How happy I was! The bonus grew to RMB 42 in 1992 and reached RMB 100 later. Now, I can earn a RMB 1,000 bonus which is called performance pay. I am pleased with my pay although prices have increased in the same period (a group leader in the cool roll workshop in Auto-3).

Table 8.3 Production Workers' Views on Their Pay by Age Group.

	Satisfied	Dissatisfied	Total
< 31	40%	60%	100%
% (N)	(67)	(102)	(169)
31--40	44%	56%	100%
% (N)	(43)	(55)	(98)
>40	52%	48%	100%
% (N)	(75)	(68)	(143)
Total %	45%	55%	100%
(N)	(185)	(225)	(410)

The question arises, therefore, as to why about half the respondents were dissatisfied with their pay? It appears that the performance of the company was a key factor. In general, workers in the profitable firms were satisfied with their pay, whilst workers in enterprises that had financial problems were dissatisfied with their pay. In the surveyed firms, the average income of workers ranged from RMB 30,000 to RMB 15,000. In reality, Auto-2, Auto-7, and Auto-3 are profitable firms whilst Auto-5 and Auto-6 have poor performances (see Table 8.4). Most workers' resentment comes from those companies with poor performances. Several workers criticised management's wrong decisions and indicated that management should encourage product diversification in order to reduce the risk of job losses. The average pay of employees in Auto-5 was low, the group leader Zhou gave his comments:

> Our performance pay is associated with the sale of products. Due to a misleading message, we lost some customers. We produced the products for those customers for a whole month, but we could not get performance pay. Now, we only get RMB 1,000 a month, we lost RMB 800 performance pay (he has been in this firm for 20 years and a group leader for 8 years).

Table 8.4 Workers' Views on Pay by Firm.

Unit: %

Firms	Auto -1	Auto -2	Auto -3	Auto -4	Auto -5	Auto -6	Auto -7	Auto -8	Auto -9
Satisfied	25	66	55	48	21	31	67	39	28

Total N=563

Auto-1 is an exception. This firm made a profit of RMB 200 million in 1993 and RMB 550 million in 1997. The level of average pay stood at RMB 30,000 in 1999. Workers were unhappy not only because they compared their pay with the surplus value they produced, but also because their pay was much lower than the pay of workers doing similar jobs in the SVW of the same region. The significant difference is that SVW paid employees dividend equivalent to five-eight months pay compared to two months in Auto-1. When I interviewed workers there, they complained that their workloads were increased without a growth of pay. Several of them mentioned that they stayed at the same wage for three years and their pay did not rise in line with their work intensification. Workers also indicated that their pay was not tied to company profitability. The chairman of the union Wang had a complaint that the firm did not give high enough pay to workers due to the nature of the state-owned enterprise:

> There is a common feeling that workers in the majority state-owned companies are suffering from hardship. If Auto-1 offers very high pay to workers, this tends to disaffect the workers in poorer performing companies. The unions can do nothing about workers' pay.

The most influential factor in respect of workers feelings about their pay was the enlarged pay disparity between managers and workers in the same firm.

Normally, managers' pay is set at up to 50% above the average level of incomes. In some firms, managers get additional subsidies.

The gap was caused by the fact that, due to production fluctuations, workers were sent home without pay, most managers were not. For example, workers' pay was reduced by RMB 30 for every day off in Auto-1. During the summer of 1999, workers in Auto-2 were forced to stay at home for a week, and their pay was reduced by RMB 150 in respect of their post pay with a slight decrease in performance pay. The situation of the workers at Auto-5 was the worst of all. A worker expressed his own feelings and those of his colleagues:

> In the days of shutdown due to production fluctuations, we had five to ten days off a month with pay being deducted at RMB 27 a day. Managers and officials did not have any days off. On those days, we lost performance pay and we took home only RMB 500--600 (after taking away six items of insurance and the person fund). How can I cope with the expenses of my family? How could I compare my pay with that of managers in our firm? How could I compare my pay with those workers in other firms in SAIC? Most workers made complaints, but managers did not (in Auto-5).

In those profitable companies, some workers also directly complained about the unfairness in their pay:

> The management is getting higher and higher pay, production workers are receiving lower pay and doing the hardest jobs. How can I take the initiative? (in Auto-1)

Efficient management had led to a disparity of income between workers and management. It is difficult for workers and management to get along with each other (in Auto-2).

How could union leaders give workers a greater voice to achieve parity of pay? The chairman of the union in Auto-5 admitted to me that the unions had no authority to determine workers' pay and could not promote equal opportunities, nor could the union offer effective independent representation. Few trade unions in China negotiate with management about employee's pay like unions in the Western countries.

Table 8.5 SAIC Managers' Views on Their Pay, Comparison with the Views of Managers in Other Companies.

Unit: %

	SAIC	Other companies	Total
Better	86	66	70
Worse	4	19	16
Stay the same	10	15	14

Total N=763

The survey of managers which I conducted in 1999 shows that 86% of respondents (managers) in SAIC felt their pay was better, being 20 percentage points higher that of managers in the other companies (Table 8.5). Workers assessed their pay as one criterion of employee relations. As we can see from Table 8.6, those workers who were satisfied with their pay were more likely to rate the relationship between workers and managers as good and very good (52%). On the contrary, only 23% of workers who were dissatisfied their pay considered they had good employment relations. These perspectives were expressed in the comments respondents gave to open-ended questions. Asked the question 'do you think workers face any particular problems with managers', one worker gave a general point of view:

The relationship between workers and managers can be epitomised by the relationship between responsibilities and remuneration. If the latter is reasonable, the relationship between workers and managers is harmonious (in Auto-9).

Table 8.6 Workers' Views on Pay and the Relationship between Workers and Managers.

Unit: %

		Views on pay	Views on pay
		Satisfied	Dissatisfied
Views on relationship	Very good	8	2
	Good	44	21
	Neither good or poor	45	64
	Poor	2	8
	Very poor	1	5

Total N=540

8.3 Workers' Views on Their Job security

8.3.1 The Job Crisis in Perspective

Management in the components companies fell into contradictions between cutting surplus workers caused by the application of lean production and enhancing the motivation of workers by providing secure jobs.

At a time when these enterprises were in the rapid development stage, workers jobs were relatively secure because management made offers to re-deploy surplus workers. For example, output of the Santana car grew from 113,500 units in 1994 to 254,000 units in 1999, with no significant increase in employees. The development of new products also created new posts for surplus workers. In 1999, the production of the Buick XSJ of SGM and the Passat car of SVW provided

opportunities for exploring new components in supply enterprises. 20 other new projects were put into production. All the firms transferred workers to new production lines. Management put significant emphasis upon making workers understand company practices and strategy, as Shen in Auto-3 put it:

> One strategy is to place workers in special training programmes. These workers still get part of their pay and are different from off--duty workers. Our director told workers on the training course that he would not like to send workers home like other enterprises outside of SAIC. He hoped workers to learn about new knowledge so as to suit them for new posts. These workers attending training without performance pay felt frustrated. However, they still have prospects of being assigned to new posts in the near future.

A further step to relieve the problem of surplus workers was to gradually withdraw component production from outside of SAIC and to arrange for it to be conducted by firms inside SAIC. In SAIC, 600 workers were shifted in this way to a subsidiary company newly set up in Auto-2. Two hundred workers in Auto-4 were switched over to a repairing firm. A number of redundant workers formed a group to deal with massive old inventories in Auto-5. Specific efforts were made to maintain full employment by eliminating overtime. Another way was to re-deploy workers to the tertiary, or service sector.

With the strong competition in the market and the decrease in profits, management confronted difficulties coping with surplus employees. Roughly 10,000 employees in SAIC were surplus to requirements (20% of the total workforce), this led to low productivity and lack of flexibility. Job security is increasingly difficult with the prospect of entering WTO. SAIC would lose protection from the state by being subject to a reduced car protective tariff (from

85% to 100% in 2000 down to 25% by 2005), and face various challenges to improve their global competitiveness.

A labour and management meeting was held in November 1999, when several redundancy programmes were launched. Firstly, early retirement was offered for those people including men over 55 year old (both managerial staff and workers) and female workers over 45 year old (50 for managerial staff) who were unable to compete successfully for their posts. A specific programme was the Voluntary Termination of Employment Programme. The standard of compensation took into account their service length in SAIC and their average monthly pay in the previous 12 months. No additional benefits accounted for in excess of 12 years' service. But high seniority employees who entered SAIC before the introduction of the 'labour contract system' could have up to 24 years service taken into account. On average, the payment ranges from about RMB 26,000 to RMB 52,000. Research conducted by Milkman (1997: 98) found that workers who opted for the buyout cease to be GM employees and received a lump-sum payment ranging from $10,000 to $55,000, depending on seniority.

At the time this research was conducted, there was no information about voluntary termination of employment having occurred. The reason was that leaving SAIC would result in poorer pay levels and suffering from worse pay in the external labour market. A worker told me that:

> I have to stay here because I am in my 40s, it is difficult for me to find a job even a marginal poorly paid job now.

Employees in SAIC chose to stay at the company, which is the opposite to what workers of GM-Linden did, where Milkman carried out her research. In any event, off-duty employees were disappointed because they had contributed to productivity improvements and they got, in the end, redundancy as their reward.

What do the unions do when workers get removed from their jobs? It is found that unions are likely to protect workers. Chai, a union chairman, in Auto-2 said:

> It is certain that our unions protect workers' interests. We need, however, to understand the word 'protect' in a broad sense. If our enterprise loses profits due to the irrational deployment of employees, we cannot protect workers' interests by providing them with good wages and benefits. If we stay the way we are, eventually all of us will be out of jobs. Unions support labour saving. Of course, we would like to protect workers if management violates the law. We join meetings to discuss the redeployment of workers and to help workers to find jobs. Specifically, our union founded a subsidiary company which is a third line of production. We did our best to arrange for more redundant workers to be moved to our subsidiary companies.

8.3.2 Workers' Views on Their Job Security

Workers were asked if they agreed with the statement 'my job is secure'. The answer could be 'agree', 'neither agree nor disagree' and 'disagree'. The results for views on job security are set out in Table 8.7. In fact, about half the workers felt insecure in their job under the lean production system. The perceptions of job security varied with different backgrounds. Overall, women were less likely to feel secure than men. Indeed, women felt most vulnerable during the labour saving because some women were transferred from first line production positions to non-manufacturing positions. It was also evident that the older the people were the more

they felt their jobs were secure. In line with this, the longer the service was the more the workers felt job security. The young workers felt their job security uncertain because of their relatively low seniority. It is the case that older workers approaching the end of their working careers were less worried about their jobs than those with longer to work before retirement. This is confirmed by the interviews. One older worker said that he would not need to have so much security but he felt sorry for younger workers.

Table 8.7 Workers' Answers on 'My Job is Secure' by Different Backgrounds.

Unit: %

	Variables	Agree	Disagree
Gender	Male	53	17
(n=520)	Female	47	20
Age group	<31	39	24
(n=510)	31--40	49	21
	>40	66	10
Education level	High school	48	19
(n=482)	College	57	15
	University	50	17
Job category	Production worker	50	19
(n=493)	Maintenance worker	60	14
	Group leader	55	17
Length of service	1--10 years	40	23
(n=471)	11--20 years	51	19
	21--30 years	65	12

Differences remain after taking into account job types. It is possible to conclude that more specialist workers have greater security. From Table 8.7, it is seen that the maintenance workers considered their job more secure than others.

The first line production workers experienced uncertainty. It was expected that the lower the education level was the less the job security workers felt. This was borne out in the results but it was only partially correct. Those workers who graduated from high schools reported that their jobs were more insecure than others. The percentage of workers who graduated from universities and believed their job to be secure (50%) was less than the percentage of workers who had graduated from colleges (57%) and believed their job to be secure. This might be because those workers who had graduated from universities knew more about the threat of their jobs caused by the application of lean production. Workers who had been to college would have more competition for jobs in the production workers' positions.

Table 8.8 Workers' Views on Job Security by Firm.

Unit: %

Firms	Auto -1	Auto -2	Auto -3	Auto -4	Auto -5	Auto -6	Auto -7	Auto -8	Auto -9
Satisfied	40	56	50	48	49	36	82	44	53

Total N=536

As Table 8.8 shows, the performance of firms affected workers' feelings on job security. Normally, workers in the high-performing firms were less worried about their job. For example, a higher percentage of workers in Auto-7, Auto2 and Auto-3 indicated their jobs were secure. The workers in Auto-6 had the lowest percentage because this firm had big losses. However, there is one exception that workers in Auto-1 were also worried about their jobs. The possible explanation might be that competition was acute and the workers had more awareness of their job insecurity there.

It is impossible to investigate if managers agreed with the statement that 'my job is secure' from this data, but other data (collected from my first fieldwork) suggests that 54% of managers felt that their job security was getting worse (Table 8.9). It is interesting to compare the managers' views on the change of job security in SAIC with other companies. There was a similar percentage for each answer amongst them all.

Table 8.9 SAIC Managers' Views on Their Job Security, Comparison with the Views of Managers in Other Companies.

Unit: %

	SAIC	Other companies	All
Better	29	28	28
Worse	54	56	56
Stay the same	17	16	16
Total	100	100	100

Total N=733

Table 8.10 Workers' Views on Job Security and Employment Relationship.

Unit: %

		Job is secure	Job is insecure
View on relationship	Very good	9	2
	Good	38	20
	Neither good nor poor	48	68
	Poor	2	8
	Very poor	3	2

Total N=517

Table 8.10 shows a positive association between job security and employment relations. Workers having secure jobs were about twice as likely as those workers having insecure jobs to report that the relationship between managers and workers was good or very good (47% compared with 22%). Only 5% of

workers having securing jobs complained that the relationship was poor or very poor. SAIC offered more job security to their workforce than other companies, so there were only a few complaints about redundancies.

This is one reason why a majority of workers (90%) agreed that lean production was good for workers compared with 5% of respondents who disagreed. Since the application of lean production, workers in SAIC had gained relatively high wages and better job security and were less worried about the mortgage for housing and paying for a car at the time I did this research. Outside the SAIC, there was a decline in wages and massive redundancy in the manufacturing sector. There is evidence that if the job is secure, a worker is more likely to accept lean production. It was also evident that the majority of workers (90%) would not let their sons or daughters to do the same jobs as them although nearly half of them thought their jobs were good. They might hope that their sons and daughters would have more intelligent occupations than an autoworker.

8.4 Workers' Views on the Role of the Unions

During the fieldwork, workers were asked a series of questions about the unions' role in the environment of lean production. Firstly, workers' views on the unions' involvement in lean production were analysed. Table 8.11 shows that most workers (87%) believed that union officials were 'strongly supportive' or 'supportive' of lean production. Only 11% of workers reported union officials were 'undecided or indifferent', very, very few (1%) answered either 'opposed' to lean production or 'did not know' the answer. Although union officials were less likely than

management (91% senior managers, 90% middle managers and 88% junior managers) to advocate lean production, this was a very small difference, with the support of union officials being only 4% less than the senior managers. This is why workers' felt that trade unions in SAIC accepted management's win-win strategy. Most union officials co-operated with management to achieve success in the company.

Table 8.11 Workers' Views on the Union Officials' Attitude towards Lean Production, Comparison with Management and Workers.

Unit: %

	Strongly supportive	Supportive	Undecided or Indifferent	Opposed	Strongly opposed	Do not Know
Senior managers (n=528)	37	54	7	1	0	1
Middle managers (n=538)	32	58	8	1	0	1
Junior managers (n=522)	32	56	10	1	0	1
Union officials (n=521)	**31**	**56**	**11**	**1**	**0**	**1**
Workers (n=522)	29	57	13	0	0	1

As Table 8.12 illustrates, the unions' attitude is strongly linked to their behaviour. Most workers (77%) considered unions participated in lean production to some extent, which might be slightly lower than for management and workers. In fact, unions' participation was limited to suggestion making, team working and training. As shown in previous chapters, management was fully committed to production process control and changes in work organisation. In the view of workers, union officials themselves were also more committed to lean production.

Table 8.12 Workers' Views on the Degree of Union Officials Participation in Lean Production, Comparison with Management and Workers.

Unit: %

	A lot	Some	A few	None	Do not know
Senior managers (n=514)	42	40	11	6	1
Middle managers (n=527)	41	41	13	4	1
Junior managers (n=517)	39	41	14	5	1
Union officials (n=515)	**37**	**40**	**15**	**7**	**1**
Workers (n=522)	45	38	11	4	1

As discussed earlier in this chapter, the union officials claimed that one of the important roles of trade unions was to support employees' participation. Workers were asked to rate how well they thought unions and managers worked together in respect of three issues concerned with employee involvement: (1) keeping everyone up to date about proposed changes; (2) providing everyone with the chance to comment on proposed changes; (3) responding to suggestions from employees

Looking at the three issues (see Table 8.13), at least 52% of workers believed that both unions and management did their best to keep employees informed of proposed changes. When assessing the performance of unions and managers in giving workers the chance to talk about changes, the percentage rate of good or very good responses dropped to 49%. Workers were least likely to rate both unions and managers as good at responding to their suggestions (47%). There was no

significant difference between union and managers at getting workers involved. The percentages are so similar that this might be that workers regarded union officials as if they were part of management.

Table 8.13 Workers' Views on Support for Employee Participation, Comparison with the Unions and Management.

Unit: %

	(1) Managers (N=541)	(1) Unions (N=542)	(2) Managers (N=538)	(2) Unions (N=534)	(3) Managers (N=546)	(3) Unions (N=530)
Very good	14	15	11	12	12	13
Good	41	37	39	37	37	34
Neither	33	31	35	34	35	34
Poor	10	14	11	13	12	15
Very poor	2	3	4	4	4	4

Note: (1) Keeping everyone up to date about proposed changes. (2) Providing everyone with the chance to comment on proposed changes. (3) Responding to suggestions from employees.

In most firms, management talked directly to workers, giving explanations of the situation. Management offered workers opportunities to communicate their concerns directly to management. Newsletters were regularly distributed to all employees. Regular meeting between top management and selected workers was a channel of communication. In most cases, this kind of meeting was held twice a year. In one unusual case, top management in Auto-4 held meetings once a month. The internet was also a means of communication. In Auto-4, the internet was used to spread information to the shop floor which had at least two computers. The matters of mutual interest and concern were markets, prices of products, workers

wages and welfare. One of the aims of management was to avoid any activity which interrupts the continuity of production.

Table 8.14 Employees' Views on Management Support for Employee Participation, Comparison with China and UK.

Unit: %

	(1)	**(1)**	(2)	**(2)**	(3)	**(3)**
	UK (22,463)	**China (n=541)**	UK (22,099)	**China (n=538)**	UK (21,703)	**China (n=546)**
Very good	9	14	6	11	5	12
Good	33	41	23	39	25	37
Neither	27	33	30	35	33	35
Poor	21	10	26	11	23	12
Very poor	10	2	15	4	13	4

Note: (1) Keeping everyone up to date about proposed changes. (2) Providing everyone with the chance to comment on proposed changes. (3) Responding to suggestions from employees.
Source: Cully *et al.*, 1999: 176 and author's survey data.

Compared with research about management's support for employee participation in the UK, Table 8.14 shows that the support of Chinese management for employee participation shares a similar trend as in the UK (the data was taken from the Workplace Employee Relations Survey)--managers do best at keeping them informed of proposed changes, but when it comes to consulting with them or taking their views into account, they perform less favourably. The data also indicates that Chinese employees were more likely to rate management good or very good at employee involvement than the UK counterparts. 55% in China compared to 42% in UK in regard to keeping them informed of proposed changes, 50% in China compared with 29% in UK in providing employees with chance to

comment on proposed changes, 49% in China compared to 30% in UK in responding to suggestions from employees.

In SAIC, the role of unions is limited partly because union are helpless. When workers were asked whom they would talk to when they felt unhappy about their work, three-fifth of workers said the managers, whilst only one-fifth of them said the unions and 13% said the Party (see Table 8.15). The union should be a grievance channel for workers but it appeared that, in this case, it was not. Some workers interviewed reported that they were obliged to talk to management simply because the unions were useless.

Table 8.15 Whom Workers would Talk to when They Feel Unhappy.

Unions	Managers	Party	Others
21%	62%	13%	4%

Total N=539

An examination was made, in general, of how workers viewed the role of unions. Table 8.16 shows that nearly half the workers considered the trade unions as neither good nor bad although two-fifths of them rated the unions as good and only one out of ten poor. Workers viewed unions as good because unions gave them encouragement to participate in new management practises, and the unions trained them to gain more skills, more competence and more knowledge. However, although much labour saving and intensification of labour have taken place at the expense of workers' long-term interests and health and safety, none of the information suggests that the trade unions are any obstacle to such changes. The low efficiency in representing workers is the main reason why about half the

workers were apathetic rating the role played by trade unions as neither good nor bad.

Table 8.16 Workers' View of the Role of the Trade Unions.

Very good	Good	Neither	Poor	Very poor
7%	34%	48%	7%	4%

Total N=561

Table 8.17 shows how managers viewed the changes of unions' role. The proportion of managers in the SAIC who agreed that an increase had occurred in the unions' role is the same as that of managers in the other companies. This result suggests that there is not much difference in terms of the change in the unions' role between the companies adopting lean production and other companies.

Table 8.17 SAIC Managers' Views on the Changing Role of the Unions, Comparison with the Views of Managers in Other Companies.

Unit: %

	SAIC	Other companies	Total
Increased	44	44	44
Decreased	21	25	25
Stay the same	35	30	31

Total N=807

Workers' opinions on employment relations are related to their view on lean production, as shown in Table 8.18. Amongst workers who believed employment relations were very good, all of them agreed that lean production was a good thing for workers. This is because management tried to build good relations by offering relatively higher pay and better job security. Some workers really benefited from this. As discussed in previous section of this chapter, workers had seen managers'

efforts to maintain good relations. For example, workers' pay had increased which linked to economic performance of their firm. Workers felt they were treated fairly. As another example, management in SAIC had made efforts to secure workers' jobs. Workers in SAIC were less likely to be redundant than those workers in most other companies. Workers saw the win-win outcome which managers had promised. However, amongst those workers who view employment relations as very poor, 71% of them still thought lean production was a good thing.

Table 8.18 Workers' Views on Employment Relations Related to Views on Lean Production.

Unit: %

		Views on employment relations					
		Very good	Good	Neither good nor poor	Poor	Very poor	Total
LP is a good thing	Yes	100	98	87	69	71	90
	No		7	3	29		5
	Not sure	2	6	28	0		5

Total N=450

8.5 Summary

Traditionally, the roles of trade unions in China were to help management spur workers to fulfil production quotas and to help in allocation welfare assistance to the workforce. Any concept of collective bargaining or of unions as protectors of workers' rights barely existed. When the Chinese labour market was deregulated and management autonomy provided managers a free hand to deal with labour, the ACFTU imposed changes to act on behalf of workers' interests. However, unions faced problems to make change in the enterprise level.

The unions' role in the auto components companies reflected their identity as both 'transmission belts' between management and workers and representatives of workers. Most union leaders saw their main task as organising production group management and to help workers by providing training. Unions helped workers to respond to flexible production and to change the pattern of work organisation. Unions also maintained some information and consultation rights at the workplace level.

New management techniques have left unions with little power to influence economic decisions in enterprises and without a strong voice. There is no means of enunciating the workers' concern about work intensification and high stress levels. On the other hand, this does not mean that unions are irrelevant in the enterprise although unions are weak and marginal in SAIC in advancing workers' interests against management.

Although management offered relatively higher wages and welfare, half the workers were dissatisfied with their pay. Several reasons can be identified. Firstly, there was a big gap between workers in profitable and non-profitable companies. It meant that poor profit, low bonus, and greater dissatisfaction. Moreover, workers felt unfairly treated when they compared their intensive labour with their lower pay. Furthermore, workers complained about the increased income polarisation between management and workers in terms both of pay and welfare benefits. Workers saw their pay as one criterion of the employment relations and management's unilateral pay determination had been the most important source of resentment in employment relations.

Management in the auto components companies faced problems to maintain job security during the process of implementing lean production. Only half the workers reported that their job was secure. There could be conflicts of interest between workers and managers. In addition, the nature of employment in China strongly affected the workers' psychology. This background made workers accept a stricter form of management control.

In general, workers regarded the unions as weak. They believed that the trade union would lose its significance if it could not do something for employees. Some of the workers saw unions as part of management. The unions were expected to independently represent workers' interests and make the labour process function more efficient.

Conclusion

This thesis has investigated the implementation of global modern management techniques in the Chinese public sector and the concomitant changes in the labour process and work organisation. In particular, it examines the impact of lean production on workers in the auto components companies from the standpoint of the many individuals on the shop floor. Throughout, this thesis draws on several areas of academic interest, principally linking the analysis of China's political economy with the sociology of work.

Part one is concerned with the impact of economic and managerial globalisation on managers in the Shanghai public sector. Chapter 2 has examined managers' social characteristics and their changing situations. In general, those male managers who come from workers' families and possess a diploma or first degree are dominant in Shanghai SOEs. But our investigation also tells us something about the broader picture, namely the way that the Cultural Revolution has affected the composition of management in China today. There is an increased proportion of young managers who have better education, and a decreased proportion of middle aged managers, some of them lost opportunities to study in universities in their 20s during the Cultural Revolution. When analysing changes taking place in China, Price and Fang observed, in a transforming economy, 'career mobility and job security may depend ever more heavily on education' (2002: 426). It is also the case in managers' promotions.

Each of the three cohorts of managers (up to the age of 35, aged between 36 and 50 inclusive, aged 51 and upwards) has different patterns of career development. Relatively well-educated young people enter managerial positions earlier than other age groups. Middle aged people have to work harder than young managers to develop their career because they experienced hardship which young managers did not experience and they returned to university and gained qualification after the Cultural Revolution. They are now occupying key managerial positions and playing important roles in the economic development. Old managers were most directly affected by the Cultural Revolution during which their career developments were interrupted. They are facing difficulty in being promoted and now face the threat of earlier retirement.

Chapter 2 also shows that managers' situation in SOEs is undergoing significant changes under pressure from internal economic reforms and external economic globalisation. The senior management now has increased power to adopt new management regimes and to exercise management prerogatives over labour. In some cases, workers who fail to conform to what management wants are punished and face the threat of redundancy.

Income disparity has increased between top managers and other managers within the same SOEs, whilst the differences in pay between top managers and workers are even larger. It seems likely that this will cause the resentment of workers and conflicts in employment relations. A further source of increasing inequality is that middle and junior managers in SOEs with financial difficulties

receive poor pay, and the situation of workers in these companies is even worse than those of managers.

The job security of managers, as well as other employees, has been diminished in the SOEs, where 'carrying surplus workers' is identified as inhibiting company profitability. During the enterprises reform of 'downsizing employment and improving performance' (*jian yuan zen xiao*), some managers were removed from their managerial positions or made redundant. In an effort to restore profitability, managers who remained increased pressure on workers by intensifying work and reducing costs. This made workers very stressed.

Chapter 3 explores the extent to which managers have knowledge of modern management techniques. It is shown that the new management techniques are implemented in a way that is 'selective and variable' (Elger and Smith, 1994: 121) and that the best known techniques are TQM, HRM and team working. The survey finds that few managers in eight industries are familiar with JIT, Kaizen and Business Process Re-engineering. It is also seen that there are pronounced differences between sectors, so that 98 per cent of managers in the automobile industry are familiar with Lean Production, but only half the managers in Chemicals and very considerably fewer managers in all other industries.

The individual backgrounds of managers and the social, technological and organisational variances within firms are also implicated in the adoption of new management techniques. It is seen that younger managers are more knowledgeable than older ones. The younger the managers are, the more they are in favour of

Western or Japanese values and assimilate new knowledge, and the less they are constrained by old traditions. Younger managers, entering managerial positions at a time of economic globalisation, have been more and more able to access new international management knowledge. The channels that facilitate this include the development of business teaching, the growth of joint-venture companies and new communication networks and web techniques.

Company practices and training are found to be the most important sources of modern management knowledge. The driving force behind these practices comes from government advocacy at the national level and top managements' strategies at the company level. As is shown, the introduction of modern management techniques such as TQM was inspired by the government.

In general, most Chinese managers, including younger ones, seem to see GMMTs as a 'hard' variant which directly leads to improvements in efficiency. Some managers, for example those in the auto components companies, are increasingly looking to 'soft' approaches to support rationalisation and development. But they are experiencing difficulties in adopting soft aspects of lean production such as team working. Warner has written that 'it seems easier to transfer "hard" technology across frontiers than its "soft" counterpart' (Warner, 1998). This suggests that the same thing may apply to management techniques.

Most managers including younger ones point out that GMMT will need to be implemented with Chinese characteristics. When Chinese managers talk about GMMTs and Chinese characteristics, they are most concerned about presenting

employment in the wider society. On the one hand, managers feel that it is difficult for them to dismiss mass surplus workers. On the other hand, they fear redundancy themselves. However, when managers are faced with difficulty in survival, then they are likely to stress leanness and further convergence with Western or Japanese management practices, with the Chinese characteristics being less emphasised.

At the time when the research was conducted, the application of new management techniques, including lean production, was not common in Shanghai SOEs. Some managers in companies suffering financial difficulties are particularly interested in selling products and paying employees' wages on time rather than learning new management techniques. They are less likely to pursue the promised long-term gains at the expense of short term profitability. They lack a long-term strategic vision and they tend to go for the quick-fix. Even though some managers have knowledge of new management techniques, they hesitate to experiment with untried techniques. Facing the pressure of market competition, they appear to be reluctant to put investment into risky flow management and supply chain techniques. They are also hesitant to form trust relationships between suppliers and producers, which is a prerequisite for the implementation of JIT.

However, it has been seen that lean production is well known in the auto sector. Part two, the case study, outlined in Chapters 4 to 8, provides insight into the implementation of lean production and its impacts on workers in the Shanghai auto components companies.

In Chapter 4, we found that one clear, and direct, mechanism for the introduction of lean production is the existence of joint venture companies, which can impose high standards on its suppliers. The high standards derive from the joint venture company's practice in other countries. This is important because it underlines the importance of joint ventures in the transfer of managerial and organisational knowledge in developing economies. The joint venture customer's requirements are a direct factor that influences management's decisions because any failures may result in the loss of its position as a supplier. Danford (1998: 425) has indicated that, 'managerial social action within supplier firms in the lean production chain is partly determined by the cost-reducing imperatives of the leading customer-assemblers'. This is very much the mechanism to be seen at work in China.

Managers are the key figures in the diffusion of new management techniques. The key factor in respect of the managers' decision making processes is their cognition of market dynamics and their sense of crisis. Top management in the components companies understand the need to ensure the accumulation of profits in the market economy, and lean production is seen as a tool to achieve this goal by waste elimination. With the explicit purpose of facilitating the diffusion of ideas, managers have become enthusiastic advocates and participants in lean production practices.

As we saw in Chapter 5, there is considerable evidence that some lean production practices, which are similar to techniques used in the developed countries, are emulated in the components companies in SAIC. Great efforts have

been made to eliminate waste by reducing work-in-progress inventories, dropping defective products and shortening lead time. However, there are uneven lean production practices both amongst different companies and even on different shop floors within one company. The workshops or firms which act as suppliers to SVW, a joint venture company, have significantly better practices than others because SVW has forced their suppliers to adopt new management techniques.

GVW, the German partner of SVW, plays an important role in imposing management changes. GVW not only introduces international quality management measures but also provides training, advice and technology for Chinese components companies in order to meet the standards. German managers on site also rigorously remind workers to apply lean production techniques and use punishment techniques for those workers who violate the new rules. It is a painful process for the employees in SVW, and its components companies, to change their old ways of thinking and doing things. In the planned economy, workers had lacked both incentives and responsibilities. Now, workers are asked to keep the 'customer priority' principle in mind, and to be individually accountable for the production of components.

Chapter 6 discloses the progressive intensification of the labour process which is in some ways similar to that reported in some sectors of developed capitalist societies (Garrahan and Stewart, 1992; Elger and Smith, 1994; Danford, 1999; Delbridge, 1998). It seems that 'market dynamics are likely to lead employers to intensify work effort……'(Gallie *et al.*, 1999: 624). The implementation of lean production inevitably has led to the intensification of labour

and increases in stress. It is the case that more than two-thirds of workers report that their jobs made them work very hard; about one quarter of workers think they never seem to have enough time to get their job done; and two-fifths of workers are worried a lot about their work outside working hours. Under the lean production system, operators have to run two or three machines rather than one, and the work pace is being continually speeded up. Central to the intensification of labour is 'that the porosity of the working day is closed up as more labour gets squeezed into it' by increasing the objective cooperation between workers or increasing their 'functional flexibility' (Nichols, 1991: 573). In these plants extra wages have not been paid to operatives for the extra work entailed in checking the status of their machines nor for their performing extra maintenance work that used to be done by maintenance workers. Moreover, when the demand for auto components declined, management did not reduce the work pace of workers. Workers were still required to work very hard when at work and they were then sent home without pay.

There is a degree of ambivalence towards lean production within the workforce. On the one hand, workers complain about the intensification of labour but, on the other hand, some workers have a more positive stance towards the perceived benefits of lean production. The fear of job loss is a key reason behind this. Fierce market competition has led to an increase in unemployment. In Shanghai, about 413,000 laid-off workers registered in the re-employment service centre in 1999 alone (*Shanghai Economy Year Book,* 2000: 283). These redundancies are partly due to enterprise bankruptcies. Auto components workers believe what management has said and hope that lean production is the best, or indeed only, way to survive.

Another reason for workers' ambivalence towards lean production is that workers are increasingly dependent on management for relatively high wages and welfare benefits at a time when the old welfare benefits have gone and the new social security system is not yet well-developed. Shanghai is a city of relative prosperity with a high cost of living compared to those of other cities in China. The average wage of employees in state-owned firms in SAIC is about double the average wage of employees in other Shanghai SOEs. That is one reason why they are proud of working in SAIC.

As has been pointed out with respect to similar factories in Turkey, 'the social meaning of working in these factories is in some ways similar to that reported in some sectors of developed capitalist societies' (Nichols *et al.*, 2002: 83), and workers in developed societies can also have ambivalent perceptions of lean production. Rinehart *et al.*, in their analysis of the CAMI car plant in Canada, point out that the relatively high wages and job security of such plants represent 'a last best hope for many to enjoy the "middle class" lifestyle that forms the basis of full citizenship in much of Canada and the United States' (Wells, 1995; cited in Rinehart *et al.*, 1997: 170). The 'last chance' exists in the context of 'widespread joblessness, underemployment, the absence or erosion of a state social security net, growing wage polarisation, and, as a consequence, employment *insecurity*' (Rinehart *et al.*, 1997: 170). Although operating at a different level, these are similar conditions to those that apply to these workers in China.

Chapter 7 addresses the changes taking place in work organisation. The team concept was introduced into the firms, and QCs and 'production group

management' were carried out. Whilst there are considerable changes taking place in the firms, it is by no means a fact that all goals have been achieved. In her study of Subaru-Isuzu, Graham suggests that:

> Even though the intra-organisational structures of Japanese management are present, the manner in which those structures are manipulated by workers does not indicate the direct transference assumed by Florida and Kenney (Graham, 1996: 66).

There is a similar position in SAIC. It is the case, as discussed in Chapter 7, that workers in SAIC do not believe that they have successfully carried out team working. Although team working is carried out on the former production group which is now held accountable for output, quality and material handling, workers feel much more peer pressure. The supposed egalitarianism of management and workers is hard to find. Workers have no sense of either being integrated in the 'same team' with management or having any control over their work tasks.

My research shows that the effects of team working are in line with other findings on this topic. For example, new team working practices are often associated with 'high surveillance' production regimes designed to secure employees' compliance with management objectives rather than increase their involvement in problem solving and decision making (Graham, 1995; Rinehart *et al.*, 1997; Delbridge, 1998; Danford, 1999). This flexibility leaves workers with little power and often entails movement to other departments or plants.

It is evident that 'kaizen from above' (Helper, 1995: 270) fits the Chinese case very well. All changes on the shop floor were initiated by management. The

whole process of Kaizen was controlled by management or engineers even when workers were encouraged to make suggestions. Workers finally found that they had no right to make final decisions. As discussed in Chapter 7, the outcomes of kaizen in the auto components companies in SAIC are, for workers, participation without determination and involvement without control, and, for management, new types of control with a mixture of coercion and consent. There was little evidence of worker empowerment in the labour process and human fulfilment as Womack *et al.* and Kenney and Florida have claimed.

Kaizen inevitably intensifies the labour process. Kaizen is used to squeeze more and more work out of workers. Workers have definitely got exhausted because work is increased every time the line is re-balanced. Workers also become more and more stressed as Kaizen targets for saving costs become higher and higher. For the future, workers will have no easy way to make reductions in costs.

Training of employees has also made progress in that workers are being increasingly trained. However, in China as in some studies in developed countries, 'in practice, skill enhancement has been accomplished through an increase in job tasks per worker which in turn has paved the way for the intensification of effort across the plant' (Stewart and Martinez Lucio, 1998: 74).

Chapter 8 discusses the trade unions' role in the new environment. The unions' role in the auto components companies reflects the legacy of co-operation with management. Workers believe that the union is playing more of a management role. When management decided to introduce lean production, the Party and unions

developed a supportive stance towards the new management system by heightening workers' loyalty to lean production objectives and realigning employees' interests with those of the company. The unions organised team working--'production group management', suggestion making and training with important influences by management.

At the national level, the ACFTU emphasised to act on behalf of workers' interests during the economic transition. At the enterprise level, however, trade unions faced problems in representing workers' interests whilst, at the same time, they supported management's prerogatives to run the economics of the enterprise. Other writers have observed of the 1980s and 1990s that 'the role of grass-roots Chinese trade unions became weaker as the political role of the Party at the local level began to weaken, at least relatively, in the enterprise' (Ding, Goodall and Warner, 2002: 434). The consequence of this is clear to be seen in the auto components companies.

In general, workers view the role of the unions as weak. And they believe that the trade union will lose its significance if it can not do something for employees. Much labour saving and intensification of labour have taken place at the expense of workers' long-term interests, and health and safety. Trade unions may well be aware of the need to protect workers' interests but, at the present time, they feel impotent to deter more excessive work intensification and to influence workers' pay and employment conditions.

Management in SAIC promised a win-win outcome at the beginning of the introduction of lean production. However, the exercise of management prerogative has been such that management unilaterally sets workers' pay without any bargaining with unions. As a result, half the workers are dissatisfied with their pay, partly because of their unfair pay, compared with either the high profitability of the company or their hard work; and partly because of the big gap between managers and workers. Resentment about pay amongst the workers I interviewed and the survey results do little to support the claims made by Womack and his colleagues.

The biggest contradiction is in calling for a commitment to continuous improvement from workers participating in lean production which is an essential ingredient to its success. It is clearly unreasonable to expect workers to cooperate fully in the process if this cooperation will lead to the loss of their jobs or the jobs of their fellow workers (Conti and Warner, 1994: 99). It is the case that workers who escape job loss can benefit financially. But continuous improvement may mean that their turn will come. A lack of output growth over time will tend to create a growing fear amongst the work force that further improvements will ultimately increase to the point where employment security will be abandoned. Workers in SAIC have seen such redundancies when the early retirement programme was carried out and some workers were relocated to other plants. In essence, management's wish to maximum profit conflicts with the interests of workers during the process towards a market economy.

Workers in CAMI in Canada have responded to lean production by staging strikes (Rinehart *et al.*, 1997). But it is also found that workers in the developed

society have sometimes used alternative means of resistance rather than an industrial action in the harsh economic environment (Graham, 1995; Danford, 1999; Alderton, 1998). As Rinehart *et al.* put it: 'Transplant stability as measured by the absence of strikes and a low level of unionisation can be attributed not to the supposed consensus-producing features of lean production but to a number of other factors including prevailing economic and political conditions' (1996: 119).

In China, we found several instances of resistance towards the new work practices, the intensification of labour and unfair pay. Individual disquiet and dissonance took the form of direct confrontation, such as refusals to test the work pace; refusals to operate two or three machines; and refusals to fill in the form on the notice-board to show the number of defects. The other pattern of individual resistance is to keep silent and to ignore the new rules made by management. For example, a worker refused to clear up after the buzzer and left the team leader to do it. Sabotage has also resulted in defective products. The third pattern of resistance adopted by workers is to raise their grievances and unfair wages with management and trade unions. This resistance did work at the beginning of introduction of lean production. As an example, some workers were given extra pay for operating two machines. But workers' resistance has declined because of the fear of job loss as they have become increasingly aware of poor labour market conditions outside of the auto industry. In any case, individual resistance cannot amount to collective challenge to management prerogatives.

My research was conducted at a time when China just joined the WTO, and this is likely to ensure an increasing diffusion of global modern management

techniques in China. This is because Chinese managers are likely to be under extreme pressure to implement modern management techniques and to improve the competitive capacity of their firms. China is a relatively new entrant into world markets and its domestic industries may be affected once tariff and non-tariff barriers come down. For example, China will cut its tariffs on auto imports from the present 70 to 80 per cent level to 25 per cent by mid-2006 according to a Sino-US WTO agreement, and this will attract more and more foreign car makers and components enterprises into China.

However, the redundancies of employees will be aggravated further if 'leanness' and labour saving techniques are applied. Unemployment will be the biggest challenge facing China, and it may have the potential to generate conflict between management and workers. The workers' futures are extremely uncertain and they are aware of the fact that they remain vulnerable to such changes. It is hard to say whether it is possible to retain production levels and stability if this happens.

Appendix A: Research Methodology

1. General

The thesis explores the extent to which global modern management techniques have been implemented in the Chinese public sector and analyses the resultant changes in the labour process and work organisation. This research project aims to address the above issues from the perspective of industrial sociology. It not only seeks to examine how social relations mediate the implementation of new management techniques, but also focuses upon the impact of these techniques upon workers. As indicated in Chapter 1, there has been an enormous amount of academic research into the transferability of Japanese management practices, particularly lean production, into North American and European settings. In contrast, there is a lack of research on lean production in the developing countries, particularly China. This research project tries to fill this lacuna by providing many first-hand stories of how managers implemented these techniques and the way in which workers and trade union officials responded. It contributes to research on social and economic development in China.

The thesis utilises both qualitative and quantitative research methods. A survey was conducted amongst 24 companies in 8 industries with 1,012 managers cross Shanghai. Case studies were conducted in the several auto components companies, where 582 workers responded to questionnaires, and managers, workers and union officials were interviewed. Three fieldwork trips took place between August 1998 and November 2000.

According to Weber (1949), all forms of social science must achieve both an understanding and an explanation of the particular phenomena under investigation. Accordingly, sociology is defined as 'a science which attempts the interpretive understanding of social action in order to arrive at a causal explanation of its cause and effects' (Weber, cited in Delbridge, 1997: 13). For the purpose of this research project, to explore and understand the changes in labour process and organisation resulting from the implementation of lean production, a research methodology which facilitates the exploration and understanding of complex social relations and their context is key (Delbridge, 1997: 14). Fieldwork is so important since the social context in China is different from those in the developed countries. This research project can not depend on assumptions that come from the research settings of developed countries and literatures alone. I therefore completed three fieldwork trips to China in order to explore what happened there, then to understand and explain it.

The reason why Shanghai was chosen as the fieldwork site is that it is the most important industrial and financial centre in China. It is also the largest Chinese city with a population of 13 million containing 8 million employees. Since 1992, the emphasis of Chinese economic development has shifted towards Shanghai. Over ten thousand joint ventures or foreign-funded companies have been established there. In order to compete with these non state-owned companies, the state-owned companies have to some extent adopted modern management techniques in recent years. The facts revealed in Shanghai may be used to inform thinking about the future of Chinese industrial management.

The auto industry is taken as the main empirical reference for the case studies. The reasons can be identified as follows. Firstly, 'the study of manufacturing organisations in economies has been exemplified by the attention paid to the auto sector' (Stewart and Garrahan, 1997: 225). The auto industry 'has been a laboratory for innovation in mass production and lean production' (Berggern, 1993; Babson, 1995). 'Many of new approaches to work organisation found their first application in the auto industry, and the accumulation of case histories therefore offers the best opportunity for investigating the impact of lean production on workers' (Babson, 1995: 21). Furthermore, Womack and his colleagues in *The Machine that Changed the World* (1990: 268) claimed China to have an automobile industry that evidenced a 'disastrous combination'- the largest in the world in terms of employment and one of the smallest in terms of output. This makes it important to consider what has happened to this industry since 1990 and what the effects of modern management methods, notably Lean Production, have been on Chinese shop floors.

Several auto components companies in the Shanghai Automotive Industry Corporation (Group) (SAIC) were chosen for the case studies, because SAIC it is one of the largest auto manufacturing groups in China, consisting of over 50 enterprises including whole-vehicle manufacturing companies and component supply enterprises, and the products of SAIC made up 45% of the domestic market. The management in SAIC claimed that it introduced lean production in 1993. It is very interesting to look into management experiences from the perspectives of managers, workers and trade union officials.

Having developed the research framework, three areas of research were carried out. (1) A pilot study. (2) A survey of managers and modern management techniques in the Shanghai public sector. (3) A case study in the auto components companies in SAIC. These were completed in three fieldwork trips which lasted for eight months in total.

2. Pilot Study

The pilot study took place in the period August to October 1998. Gaining access to interview managers and workers in a Chinese company by a person living abroad is difficult even though the visit does not involve any sensitive topics. Several scholars and friends who were contacted confronted obstacles in obtaining access because some managers had been reluctant to allow research, particularly in those companies suffering from economic hardship. Managers did not reveal their real reasons and they merely said they were struggling against financial losses and could not allow time for the research. In a silk company, a middle manager in the import and export department met me and gave a brief introduction to the company, but he failed to get permission from the top managers for access. A similar response came from another company in the textile industry where the party secretary had been worried that the research would be reported in the public domain. It took a month waiting for the arrangements to be made in Shanghai. During this period, pilot interviews were conducted in several state-owned textile companies in the city of Nantong. Some experience of talking to managers was obtained and the questionnaires were tested.

It was fortuitous that support was obtained from a high ranking trade union leader in Beijing and his two colleagues in Shanghai. At first, they also found difficulty because the managers questioned my identity when they attempted to introduce me to them. In some cases, I was rejected because I had studied abroad. These union leaders then chose some managers and union leaders who had been to the UK in order to let me more easily get access to their companies. A union chairman in a textile company had been trained in a Business School in Manchester for three weeks. He understood what I would like to do and introduced me to management in his firm. A director of a firm in the chemical industry had also been trained in the University of Warwick and gave me full help.

I went to ten state-owned companies by making use of trade union and management contacts in later months. Amongst them, three were in the chemical industry, one each in the electric and construction industries, two in the textile industry, two in the transportation industry and one in the public services. I talked to 8 directors and 6 party secretaries, 6 trade union chairmen and 30 middle managers and 16 junior managers. Most interviews were tape-recorded. Each interview lasted 1 to 2 hours. Various documents and statistics were collected. In addition, I visited 3 experts from the Chinese Academy of Social Sciences and 2 scholars from the Shanghai Academy of Social Sciences, 4 professors from the School of Economic Management, Jiaotong University. I also talked to several persons from the Shanghai Municipal Trade Union Council.

My study focused mainly upon managers and modern management techniques in state-owned companies in Shanghai. It concerned the following questions: (1)

what kinds of situations had managers occupied during the period of enormous change since the economic reforms? How did particular managers think and feel about their situations? (2) What was the extent to which modern management techniques were capable of being transferred to Chinese companies? How were managers influenced by modern Western management techniques? It is these interviews that provided the background that sharpened the structure of the second interview stage and the survey.

3. Survey of Managers and Modern Management Techniques in State-Owned Companies

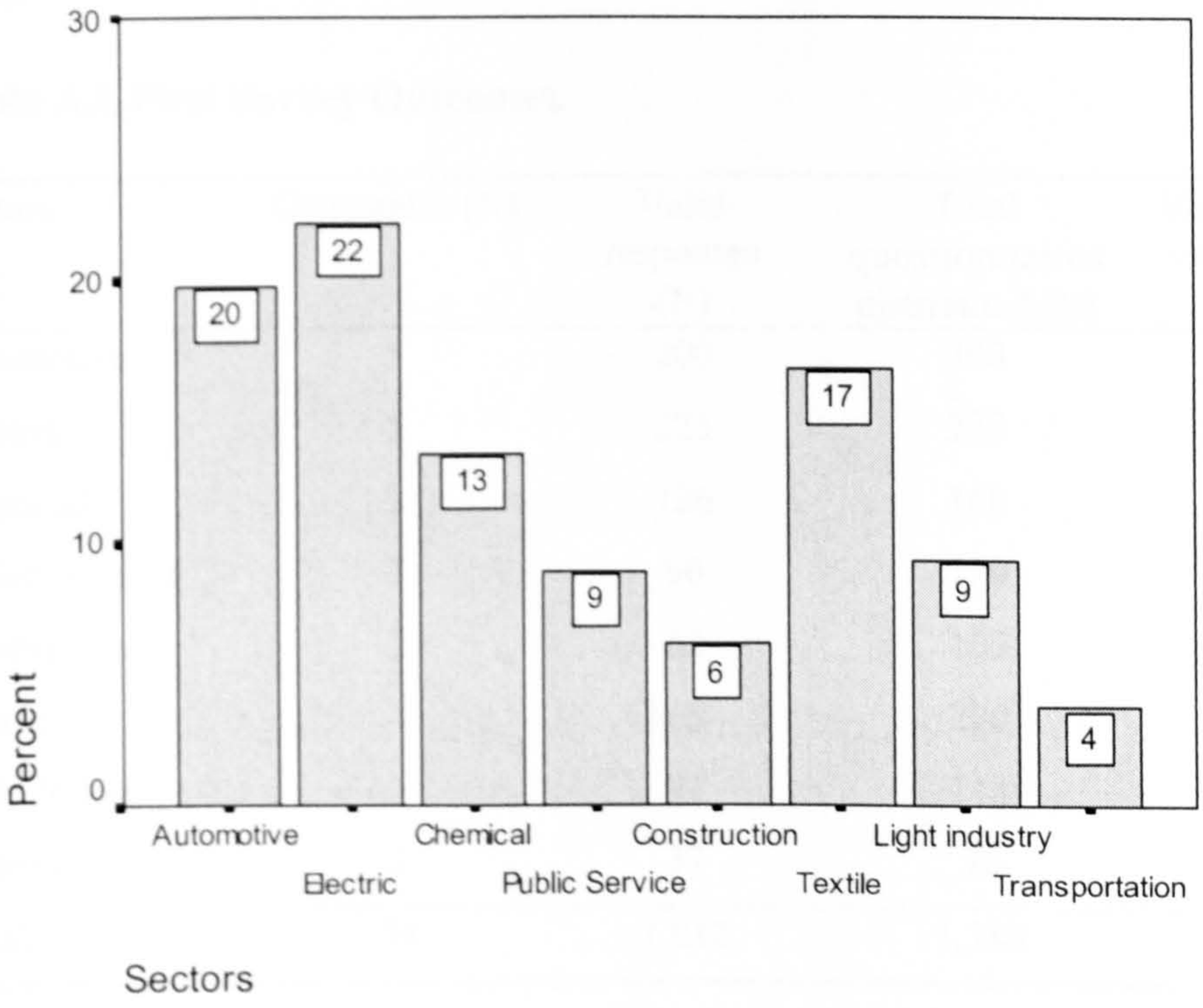
The survey of managers and management strategy was undertaken during my second trip from June to August 1999. Based on the pilot study, I designed the questionnaire on similar themes to focus not only on the social characteristics of managers but also on the managers' knowledge of modern management techniques. Broadly, these subjects were covered:

- The background of management
- Their knowledge of modern management techniques
- The sources of knowledge of modern management techniques
- Their attitude to modern management techniques
- Impacts of implementation of new management techniques on management change and performance

Major efforts were made to get access to companies through contacting with trade union leaders, managers and professors. Several companies appeared to ignore my requests completely whilst several companies politely refused using various

excuses. As a case in point, in the morning when I was leaving for a company, I received a phone call from a union official who told me that the appointment would be cancelled. He explained that the top managers in his company did not agree with the research because they feared it might bring trouble. I was very disappointed. However, I kept contacting the people I used to know both by phone and personal visits to seek support. Most help came from trade union leaders.

Figure A.1 Sectors Surveyed



As a result of this arduous process, 24 companies in 8 sectors eventually participated in my survey (see Figure A.1). Amongst them, the seven companies that took part in the pilot study in 1998 were traced to observe any changes. I had no difficulty gaining access to these companies due to the previous contact. In order to compare different companies in one sector, five or six firms were chosen from

each of the key sectors which contain big companies or groups. In each sample company, I talked to senior managers and the union chairmen about the objectives of the research and requested permission for a survey. They helped me to distribute the questionnaires. I tried to ensure that the survey covered managers at different levels. In the biggest company with 9,000 employees, I distributed 100 questionnaires to managers and received 67 returns. In the smallest company with 609 employees, I distributed 30 questionnaires that yielded 26 responds. The questionnaires completed by managers in the different sectors are summarised in Table A.1 in more detail.

Table A.1 First Survey Outcomes.

Sectors	Companies (N)	Valid responses (N)	Total questionnaires distributed (N)	Valid response valid rate (%)
Automotive	5	200	300	67
Electric	5	225	270	83
Chemical	2	136	160	85
Public services	2	90	120	75
Construction	2	62	100	62
Textile	4	168	200	84
Light Industry	3	94	118	80
Transportation	1	37	50	74
Total	**24**	**1,012**	**1,318**	**77**

In the chemical industry, 136 managers answered questionnaires, representing the highest response rate (85%), followed by the textile industry (84%). The lowest response rate (62%) was found in the construction industry. Thus 1,012 replies were

received from 1,318 questionnaires issued, giving an overall valid response rate of 77%.

The survey focused on big companies in Shanghai. Table A.2 shows the sizes of the 24 companies in terms of the number of their employees. The highest proportion (42%) of participating companies is for those companies with 3,001 to 5,000 employees. Companies with 1,001 to 3,000 people constituted the next largest category (26%). Those who employed 1,000 and less or 5,000 and more workforce each formed 16% of the total. At the time of my research (1999) in Shanghai, the workforce was 8.12 million and there were 1,810 state-owned industrial enterprises (*Shanghai Economy Year Book*, 2000: 316). However, it was very difficult to know exactly how many employees there were in SOEs because SOEs were being changed to joint venture companies or closed down and employees would leave. I tried to conduct surveys in 24 big SOEs in different locations in order to create the opportunity for some generalisations.

Table A.2 Companies in the Sample by Size of Workforce.

1,000 and less employees	1,001—3,000 employees	3,001—5,000 employees	5,001 and more employees
16%	26%	42%	16%

In addition to the survey, I interviewed top managers or middle managers in each company in order to obtain background information about their companies, information on personal details such as their pay, their job and what they had done, and their perspectives on the transformation of modern management techniques.

Each interview was conducted individually. Analysis of the results of the interviews is presented in Chapters Two and Three. At the same time, I visited 12 scholars of social science in order to exchange ideas and gain information from them.

By keeping to a strict timetable I was able to complete the survey within the planned schedule. The large scale survey programme was actually completed during a very hot summer in Shanghai. Although it was hard work, I got lots of encouragement from the managers and union leaders I interviewed. A top manager in the chemical industry gave support because he was practising lean production in his firm and he had a common research theme. The encouragement given is also reflected in the high quality of the questionnaire responses and the comments respondents wrote to open-ended questions, as a middle manager in Cons-1 put it:

> This is the best questionnaire I have read. It does not just ask me to tick but it makes me think a lot. When I finished the questionnaire, I felt very depressed because I knew so little of modern management techniques.

A similar feeling was expressed by a junior manager in the light industry:

> Filling in this questionnaire made me appreciate the importance of modern enterprise management. Chinese managers should learn modern management techniques which we can use to compete in the world.

4. The Case Study in the Auto Components Companies in SAIC

The case study looked at the implementation of lean production in the auto components companies in SAIC. The fieldwork was accomplished in two periods.

The first fieldwork was conducted during June to August 1999 when I conducted the survey of managers and modern management techniques across Shanghai. I focused upon management's attitudes towards lean production and exactly how they implemented it. I completed both surveys and interviews at this stage. The second period of fieldwork was carried out in SAIC from September to October 2000. I concentrated upon how the application of lean production impacted upon workers and how workers and trade unions responded to it.

Gaining access to SAIC was easier than I had imagined it would be. There are three main reasons for this. Firstly, a union leader at municipal level asked the union leaders in the headquarters of SAIC to support me. The union leaders in SAIC were enthusiastic and helpful. Moreover, the managers and employees in SAIC had many opportunities to be trained abroad. They believed they should learn modern management techniques, so they allowed researchers from abroad to enter their companies. They trusted those who would objectively analyse what happened in their company. In addition, management recognised that workers were satisfied with the economic benefits from adopting lean production and they needed not worry about any problems being exposed. In general, the fieldwork was carried out smoothly. Only one thing interrupted my research schedule--the vacation shutdown of companies. I spent a good deal of time contacting enterprise union chairmen. It was not easy to make appointments. Sometime I had to cancel my plans.

During the first period of fieldwork, I investigated managers amongst five state-owned component companies, that is, companies in which the state had a majority holding. I distributed 300 questionnaires to managers which yielded 200

responses, a 68% valid return rate. Although I used questionnaires in the same way as with the survey managers in other industries, I gained most information from first hand interviews. I interviewed 8 heads of department in the manufacturing, 2 managers in quality control sections, 6 production managers and 16 union officials. Both semi-structured interviews and open ended discussions were conducted on an individual basis and in groups. Each interview lasted two hours on average and was tape-recorded.

The interviews were concerned with management strategies, the process and characteristics of the application of lean production. In particular, I examined the degree to which certain management techniques were being used. I looked at the reduction of work-in-progress inventories, Kanban, zero defects, JIT, Kaizen, team working, TPM. I investigated performance results in the reduction of inventory and lead time, cost cutting, achievement in gross output value and sales value. I listened to managers' voices on the possibility of transferring lean production methods to China.

Besides empirical observations in the firms, I collected many books and references, internal documents and reports. I had a tour of two big joint-venture car manufacturing companies SVW and SGM, and a Japanese-joint venture components company.

The second period of fieldwork focused upon the views of workers instead of the managers surveyed in the previous year. It is useful to compare both perspectives for, as Nichols (1986: 260) points out, a study which 'systematically

samples both managers and workers is always likely to provide at least some snippets of information that rarely surface in other accounts and to suggest different lines of interpretation'. Furthermore, the fieldwork captured changes over a period of time. These changes included the new challenges confronted in the auto industry and the new practices of lean production in SAIC. There was also new information about how Chinese managers were learning modern management techniques.

Interviews and surveys were related to the impacts of management control on workers, the changes in organisation and employment relations. I addressed the following questions: did workers work harder than before? Was team working efficient? What were workers' views on Kaizen? What did workers' training consist of? What were workers' views on the changes to their pay and job security? What was the role of the trade unions? Should Chinese SOEs apply lean production?

In order to take a general view of workers in SAIC, I conducted surveys in 9 companies of which five firms had been involved in the previous survey (1999). I distributed 900 questionnaires in total and received 659 responses (amongst them 77 were trade union officials who all agreed to participate in survey) with the help of a union leader from headquarters who urged the enterprise union chairmen to collect questionnaires. I tried to ensure that the survey mainly covered assembly workers and operatives. The return rates of the questionnaires are highlighted in TableA.3.

Table A. 3 Second Survey Results.

Companies	Distribution (N)	Returned questionnaires (workers) (N)	Returned questionnaires (TU officials) (N)	Rate of return (%)
Auto-1	100	72	0	72
Auto-2	180	109	18	71
Auto-3	100	78	2	80
Auto-4	80	26	21	59
Auto-5	100	66	9	75
Auto-6	100	85	0	85
Auto-7	80	58	0	73
Auto-8	80	44	14	73
Auto-9	80	44	13	71
Total	**900**	**582**	**77**	**73**

Of the total of 582 workers surveyed, 66% were male and 34% were female. As for their age distributions, 38% of workers were found to be over 40. Those under 31 years old constituted the next largest group in the sample, occupying 38%. The group from 31 to 40 years old was 24%. More than half the workers (56%) came from families in which their fathers are also manual workers. Their education levels were not high; one in five graduated from college or university, others received education only from high school or middle-level polytechnic school.

The majority (82%) of surveyed workers were direct production workers who either operated various machines or worked on assembly lines. The others were maintenance workers (10%) and group leaders (8%). 35% of respondents had worked for the company over 20 years, 28% between 11 to 20 years and 37% between 1 to 10 years. Workers had varying duration of contracts. Amongst them,

19% held indefinite contacts (>10 years), 66% long-term (<10 years, >5 years) contracts, 14% short-term (<5 years, >1 year) contracts and only 0.2% temporary (<1 year) contacts. Two in three workers (68%) had not changed their job type since the beginning of their careers. Thus this sample which was composed mainly of experienced workers (four-fifth, who had worked in SAIC more than five years) is very appropriate for assessing the new management techniques introduced recently.

During the period of research at SAIC, about 40 employees from, in the main, 6 companies were interviewed. I spent three or four days in each company. I talked to 3 heads of department of production and 3 production managers, 2 supervisors, 22 shop floor workers and 10 union officials. Additional questions varied in accordance with the interviewee's occupation. For example, I asked heads of department of production about cost savings and team leaders about the activities of their teams. Workers and union officials were able to talk freely to me and told their own stories about their ambivalent feelings towards the changes in their working lives. Whilst they expressed common feelings that they did benefit economically from the application of lean production, they were also disaffected with intensified work and the disparity in pay between managers and workers. Their own words are valuable and are quoted in the chapters. Besides interviews and surveys, I also had opportunities to observe the one-piece flow of materials, cells, Kanban, the team information board and how workers did their work.

Fieldwork was a very arduous task. On the day of the survey or interviews, I caught the company bus at the 6:00am and began my research at 7:00am when the shift started. I had lunch with workers, managers and union officials. I was able to

obtain information about many things beyond the outlines of the interviews. I left the companies at 4:00pm and took the journey back which lasted an hour. If I missed the chance to travel by the company bus, I had to spend four hours in travel. Each night, I sorted out the notes, listened to the tapes and prepared the different interview themes. This successful fieldwork built a foundation for the in-depth research and analysis. The survey data were entered into computer and the SPSS programme was used for data processing and statistical analysis. The results of the case study are represented in Chapters 4, 5, 6, 7 and 8. The outline of interview in the pilot fieldwork and two survey questionnaires are reproduced in Appendices B, C and D.

Appendix B: Outline of Managers Interview in the Pilot Fieldwork

1. Where were you born?

2. How old are you?

3. What did your father do?

4. When did you enter primary school? When did you leave high school?

5. Have you studied in a college or university? If yes, when and at which university did you study? Which discipline did you study?

6. What qualifications do you have?

7. Are you married? If yes, what does your spouse do?

8. Whom do you live with? How about their employment situation?

9. When did you start to work? How many jobs have you done?

10. How did you enter this company? What was your first job?

11. How long have you been engaged in management? How many times have you been promoted?

12. How did you get this position?

13. Are you a Party member? If yes, when did you join the party?

14. Have you got any position in the Party? If yes, what have you been in charge of?

15. Do you have any knowledge of modern management methods? If yes, where did you learn from?

16. Have you learnt about the theory and practice of Japanese management?

17. Do you know what the terms of TQM, HRM, JIT and Lean Production mean?

18. Have you applied or developed these management theories to your management practice? If yes, how did you do it?

19. What are most important Japanese and Western management techniques you need to learn from?

20. Have you taken any managerial training? If yes, what were they?

21. What have you learnt by training?

22. What are the main changes in management since 1992 in this company?

23. What management decisions has the top manager made since 1992? How effective were they?

24. What was the hardest decision you ever had to make, and how did you handle it?

25. How do you increase the quality consciousness of workers?

26. Does this company have a good culture?

27. Have there been any changes in your wage system?

28. How do you motivate people? What is the best way to incentive and rewards?

29. Have you practised team work?

30. What changes have taken place since the introduction of the 'Director Responsibility System'? Is it a good thing? What do you think it needs to improve?

31. Do you think that you have more power since 1992? If yes, in what respects and to what extent have you increased responsible autonomy?

32. How are workers' interests taken account of?

33. What decision have you made without discussing with the Party secretary? How about the result?

34. What should be the relationship between you and the Party secretary? why?

35. What difficulties have you encountered in management? How have you resolved them?

36. What has caused you the most problems in management?

37. To what extent is good relationship (*guang xi*) important for you in management?

38. What is the real impact of the change from the 'iron rice bowl' to the labour contract system?

39. When did you start to sign contracts with workers?

40. Do you think that workers need to be more skilled? Have you developed any training program for workers?

41. How did you decide to lay off a worker? On what basis did you lay off them? Do you know of any resentful workers?

42. What difficulties did laid-off workers experience? How did you resolve these problems?

43. How do you reduce number of worker laid off?

44. Do you worry that you will be laid off? How do you try to keep your current job?

45. Who gives you an assessment of your performance?

46. What is necessary to make the company achieve more profits? What are the challenges involved in achieving high productivity?

47. Do you think that the implementation of modern management techniques is a good way for company to make more profits?

48. Is reducing employee number the only way to make more profits?

49. Is it important to rely on the working class in your company?

50. How has the role of the Trade Unions changed?

51. What part should the Trade Union play in the implementation of modern management techniques?

52. What issues should trade union participate in the discussion of?

Appendix C: Management and Modern Management Techniques Questionnaire

1. Basic Information

(1) date of birth

(2) place of birth

(3) gender

(4) father's occupation

(5) schooling (tick level)

secondary school — college
university (specify subject) — postgraduate school (specify subject)

(6) marriage (tick)

married — single
if married, what is your spouse's occupation?

(7) Are you a Party member? (tick) yes no
if yes,
when did you join the Party?

(8) Have you had any experience of the Cultural Revolution? How has the Culture Revolution affected you?

2. Brief information on your career and your present job

(1) position — department

(2) How did you get this position?

by advertisement — by appointment
by election — others (specify)

(3) How long have you held your present position?

(4) How many people are you responsible for?

(5) Is this your first job? yes no
If not, how many firms/ organisations have you been employed in during your career?

(6) When did you get your first job?

(7) Have you ever worked in the private sector? yes no
If yes, how many years?

3. Management Training

(1) Have you attended any management training in the last 12 months?

tick one box only.

none less than 1 day 1 to less than 2 days
2 to less than 5 days 5 to less than 10 days 10 days or more

(2) Have you attended any management training?

in company in section abroad others no

If you have received no training ignore the next question

(3) Please specify content of training and tick appropriate box on the right:

Content of training	Very useful	Useful	Not very useful	Not at all useful

4. Views on Modern Management Techniques

(1) How familiar are you with the following management methods?

	Not at all	A little familiar	Some familiar	Very familiar
Kaizen				
LP				
QCs				
Team				
JIT				
BPR				
FP				
TQM				
HRM				

LP=Lean Production, QCs=Quality Circles, JIT=Just-in-Time, BPR=Business Process Reengineering, FP=Flexible Production, TQM=Total Quality Management, HRM=Human Resource Management.

(2) How do you know about the following management methods?

Techniques	Company practice	Training	Mass media	Education	Books	Others
Kaizen						
LP						
QCs						
Team						
JIT						
BPR						
FP						
TQM						
HRM						

LP=Lean Production, QCs=Quality Circles, JIT=Just-in-Time, BPR=Business Process Reengineering, FP=Flexible Production, TQM=Total Quality Management, HRM=Human Resource Management.

(3) How do you rate these methods for use in China? (Please tick each box that is appropriate)

Techniques	Very useful	Useful	Not really useful	No use at all	Don't know
Kaizen					
LP					
QCs					
Team					
JIT					
BPR					
FP					
TQM					
HRM					

LP=Lean Production, QCs=Quality Circles, JIT=Just-in-Time, BPR=Business Process Reengineering, FP=Flexible Production, TQM=Total Quality Management, HRM=Human Resource Management

(4) In which respects have you participated in management?

product design	technical innovation	production
investment	market sale	personnel

(5) Compared to 1992, how have things changed for you in the following respects?

	Better	Worse	Stay the same	Don't know
Right to make decisions				
Workload				
Skill				
Pay				
Stress				
Satisfaction				
Job security				
Career prospects				

(6) Compared to 1992, how have things changed in your company in the following respects?

	Increase	Decrease	Same	Don't know
Flexibility of production				
Saving				
Labour turnover				
Profit				
Protection of employee's interest				
Role of the unions				
Co-operation of the Party secretary and director				

(7) What is your view on the following employment aspects?

	Very reasonable	Fairly reasonable	Unreasonable	Don't know
(1) Director responsibility system				
(2) Labour contract system				
(3) Labour saving				
(4) wage system				
(5) Social insurance system				

(8) What is important for state-owned companies to avoid loss? Please tick.

a. reforming property right
b. adjusting structure of production.
c. increasing investment
d. improving management
e. open account to public
f. government support
g. rely on working class
h. others

(9) Do you think that state-owned companies should be privatised? Please list three best things and three worst things about privatisation.

(10) In management, what is the biggest difficulty which you are facing?

(11) Do you think that the union is necessary? Why?

(12) In general, how would you describe relations between managers and employees here?

Very good	Good	Neither good nor bad	Poor	Very poor

(13) Do you think managers face any particular problems with employees in China? Please state.

(14) What is your view on using modern management techniques? Why?

(15) What constitute a good management?

(16) In general, do you think modern management techniques have any significance for society?

Thank you for filling in the questionnaire.
Please use this page and the next to comment on any of the above matters at greater length. There is only so much that can be compressed into a questionnaire and your personal comments will be greatly valued.

Appendix D: Worker Questionnaire in SAIC

Workers and Modern Management Techniques Questionnaire

1. Date of birth

2. Gender: male female

3. Father's occupation

4. Schooling (tick level)
   secondary school college
   university (specify subject) postgraduate school (specify subject)

5. Marriage (please tick)
   married single
   If you are married, what is your spouse's occupation?

6. Your job type

7. Workshop

8. What's your status in the firm?
   permanent short term contract temporary

9. When did you start to work?

10. How long have you held your present job?

11. Is this your first job? yes no
    If not, how many firms/ organisations have you worked for?

12. Have you ever been 'off duty'? yes no

13. How long does it normally take before new workers are able to do the job as well as more experienced workers already working here?

14. How satisfied have you been with the following?

	Very satisfied	Satisfied	Dissatisfied	Very dissatisfied
Your usual take home pay				
The people you work with				
Your work prospects				
Physical working conditions				
The way your section is run				
The way your abilities are used				
The interest and skill involved in your job				

15. How familiar are you with the following management techniques?

	Not at all	A little familiar	Some familiar	Very familiar
Kaizen				
LP				
QCs				
Team				
JIT				
BPR				
FP				
TQM				
HRM				

LP=Lean Production, QCs=Quality Circles, JIT=Just-in-Time, BPR=Business Process Reengineering, FP=Flexible Production, TQM=Total Quality Management, HRM=Human Resource Management.

16. How do you know about the following management techniques?
In each case please tick one or more.

Techniques	Company practice	Training	Mass media	Education	Books	Others
Kaizen						
LP						
QCs						
Team						
JIT						
BPR						
FP						
TQM						
HRM						

LP=Lean Production, QCs=Quality Circles, JIT=Just-in-Time, BPR=Business Process Reengineering, FP=Flexible Production, TQM=Total Quality Management, HRM=Human Resource Management.

17. To what extent do you use these following techniques?

	A lot	Some	A little	Not at all
One-piece flow				
Kanban				
Multi-tasking				
Zero inventories				
Zero defects				
Team				
Kaizen				
TPM				
MRP				
Cost cutting				

18. How do you rate these methods for workers?

	Much better	Better	Neutral	Worse	Much worse
One-piece flow					
Kanban					
Multi-tasking					
Zero inventories					
Zero defects					
Team					
Kaizen					
TPM					
MRP					
Cost cutting					

19. Do you agree or disagree with the following statements about your job?

	Strongly agree	Agree	Neutral	Disagree	Strong disagree
My job made me work very hard					
I never seem to have enough time to get my job done					
I feel my job is secure in this workplace					
I worry a lot about my work outside working hours					

20. Since your firm applied lean production, how many things have changed for you in the following respects?

	Better	Worse	Stay the same
Right to make decisions			
Workload			
Pay			
Stress			
Skill levels			
Satisfaction			
Health and safety			
Job security			
Job prospects			

21. Do you work in a team?

yes no

If yes, do you agree following opinions?

	Agree	Disagree
Team working has given me new job skill		
Team working has give me more tasks to do but no real skill		
I believe that all managers and employees should be members of the same 'company team'		
I think that management here believe they are in a separate team to the employees.		
Working in a team helps me feel like I am part of the company		
Working in a team gives me a say over how my job is done		
Working in a team is a way to get us to work hard		
Working in a team gets us all pressuring one another		

22. Have you attended any training in the last 12 months? Tick one box only.

More than 40 days	31-40 days	21- 30 days	11-20 days	1-10 days	None

23. Which training courses did you attend? How useful were the courses that you attended?

Training content	Very useful	Useful	Not very useful	Not at all useful

24. In your opinion, what is the attitude of following people to lean production?

	Strongly supportive	Supportive	Undecided or Indifferent	Opposed	Strongly opposed	Do not Know
Senior managers						
Middle managers						
Junior managers						
Union officials						
Workers						

25. In your opinion, to what degree do following people participate in lean production?

	A lot	Some	A few	None	Do not know
Senior managers					
Middle managers					
Junior managers					
Union officials					
Workers					

26. What are barriers in applying lean production in your company? Please tick the biggest three.

old idea	old mechanism	management style
employees' motivation	lack of knowledge	relationship

27. What is the biggest difficulty for your company to apply lean production?

28. What are your general opinions of lean production?

29. In general, how would you describe relations between managers and employees here.

very good	good	neither good nor bad	poor	very poor

30. How good would you say managers here are at:

	Very good	Good	Neither	Poor	Very poor
Keeping everyone up to date about proposed changed					
providing everyone with the chance to comment on proposed changes					
responding to suggestions from employees					

31. How good would you say the trade union here is at:

	Very good	Good	Neither	Poor	Very poor
Keeping everyone up to date about proposed changed					
providing everyone with the chance to comment on proposed changes					
responding to suggestions from employees					

32. Would you like your son/ daughter to do this job?
yes no

33. Do you think this is a good job for someone like you?
yes no

34. If you had a grievance at work whom would you go to first in order to try and do something about it?
Trade union management party

35. Do you think workers face any particular problems with managers in China?

36. What is your view on the trade union in the firm?

very good	good	neither good nor bad	poor	very poor

37. What should Trade union be like?

38. Do you think team leaders should be elected?
yes no

39. Who benefits from teamwork?

40. Which of the following do you most agree with?
[1] lunch break is a good time for us to get together as a team to go over things and solve problems
[2] lunch break is our personal time, it shouldn't be a time for company business
[3] disagree with both of them

41. In the last month how often have you worked with physical pain or discomfort?
[1] every day [2] most days [3] half the time [4] a few days [5] never

42. In the last month how often has dust in the air led to physical discomfort (eyes, breathing)?
[1] every day [2] most days [3] half the time [4] a few days [5] never

43. In the last month how often has air temperature led to physical discomfort (too hot, too cold)?
[1] every day [2] most days [3] half the time [4] a few days [5] never

44. In the last month how often has noise led to physical discomfort (hearing problems, headache)?
[1] every day [2] most days [3] half the time [4] a few days [5] never

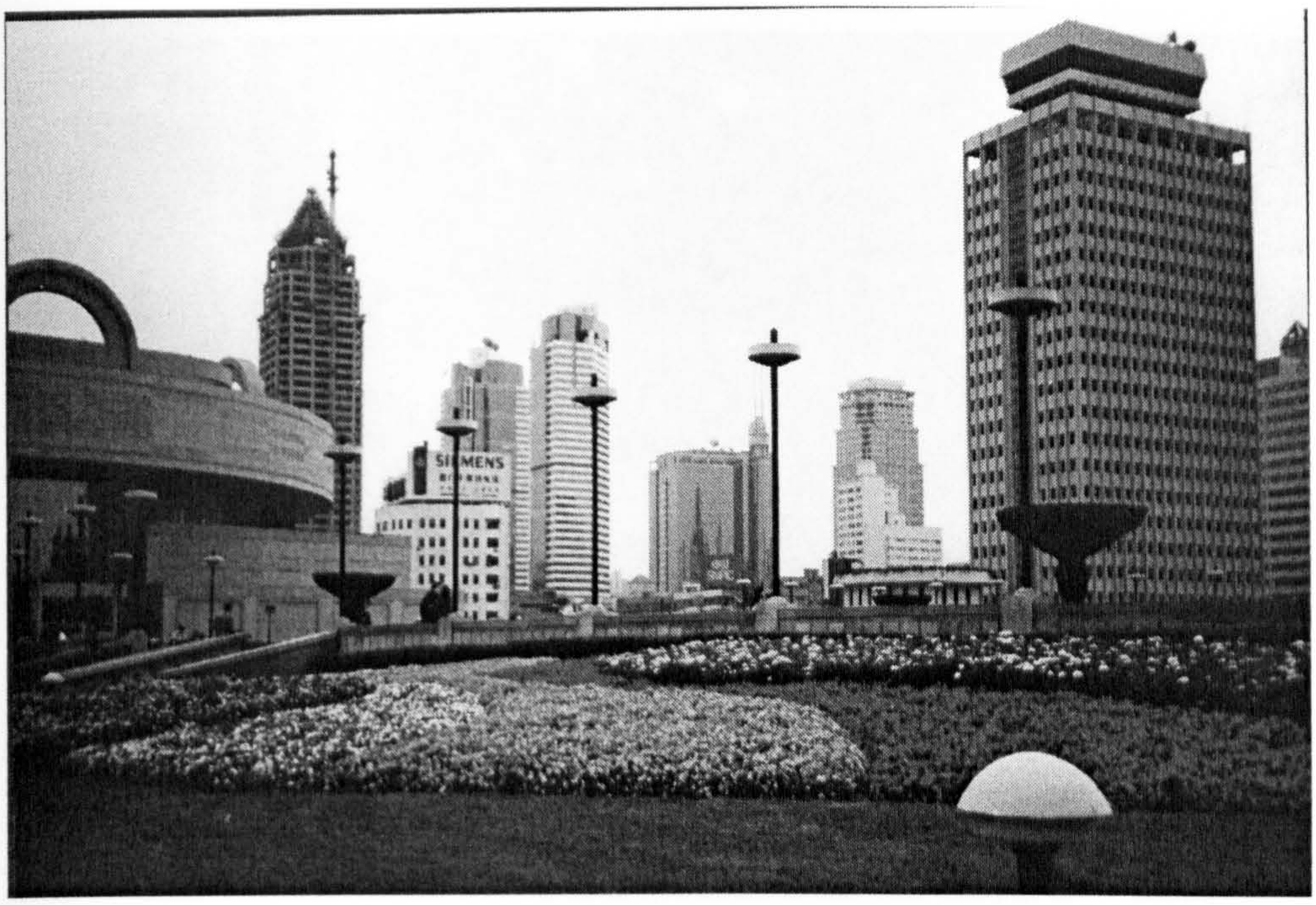
45. Could you work at the pace of your current job until you are 55 or retirement?

46. Do you work shifts?

47. If you found a way to do your job that was easier or faster than the specified way, what would you do?

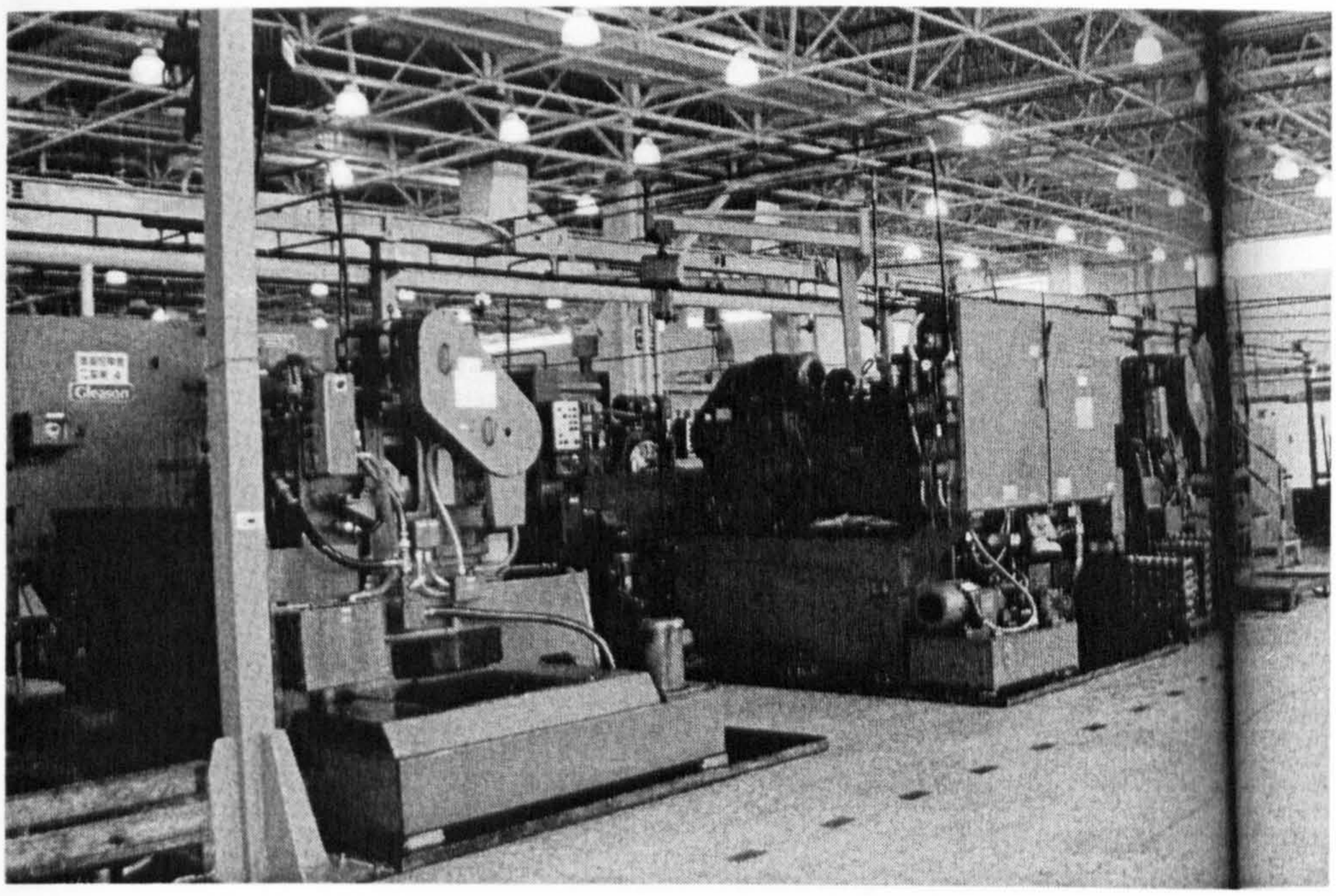
[1} keep it to yourself [2] share it with no one other than a few co-workers
[3] tell the team leader [4] submit a suggestion [5] other

48. How do you describe yourself, apart from being a citizen of China?



Picture 1. The City of Shanghai.

Picture 2. Auto-1 is Situated in a Suburb of Shanghai--*Jia Ding*.

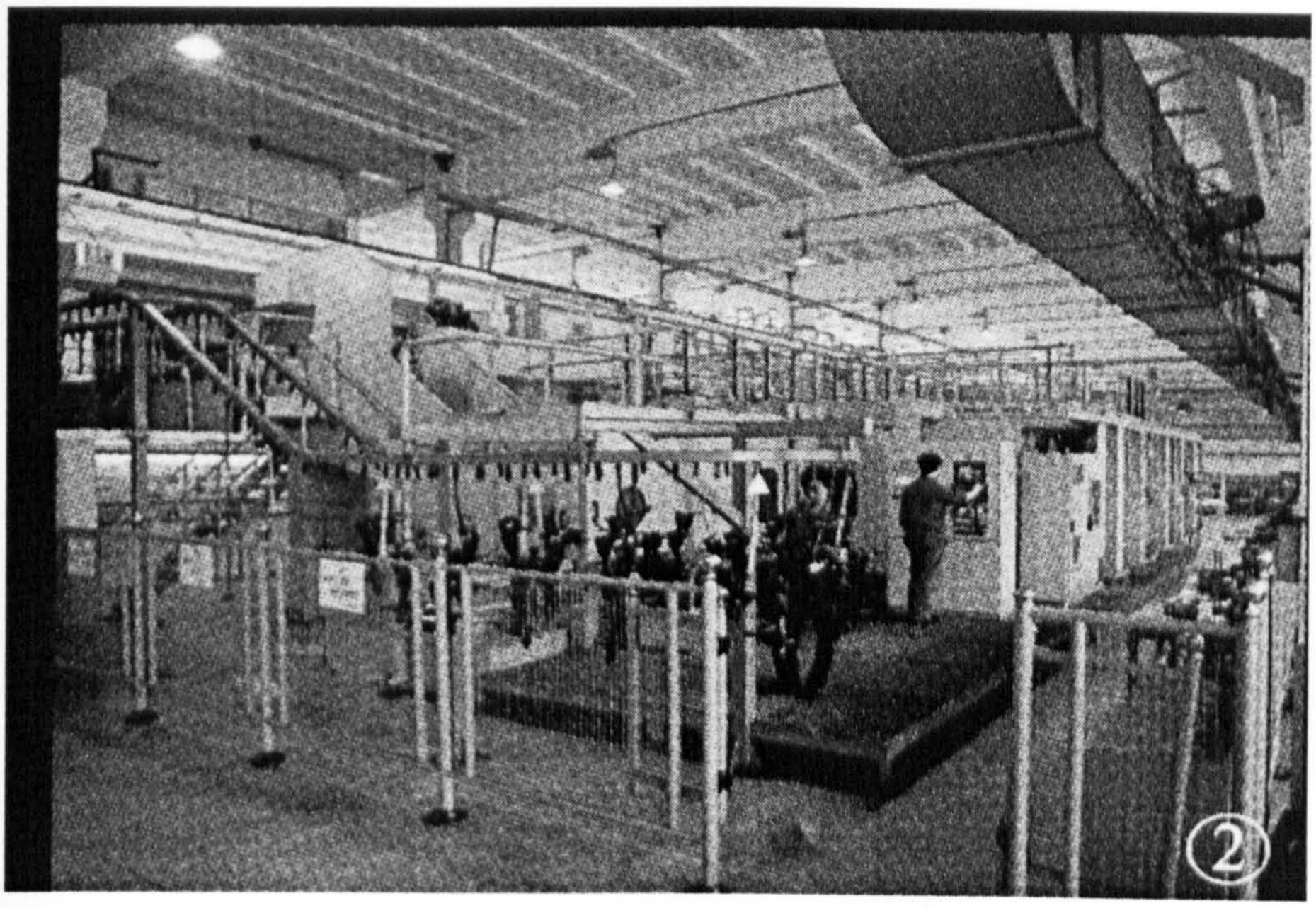


Picture 3. Key Machines in Auto-1 Were Imported from Advanced Countries.
Source: Booklet in Auto-1.

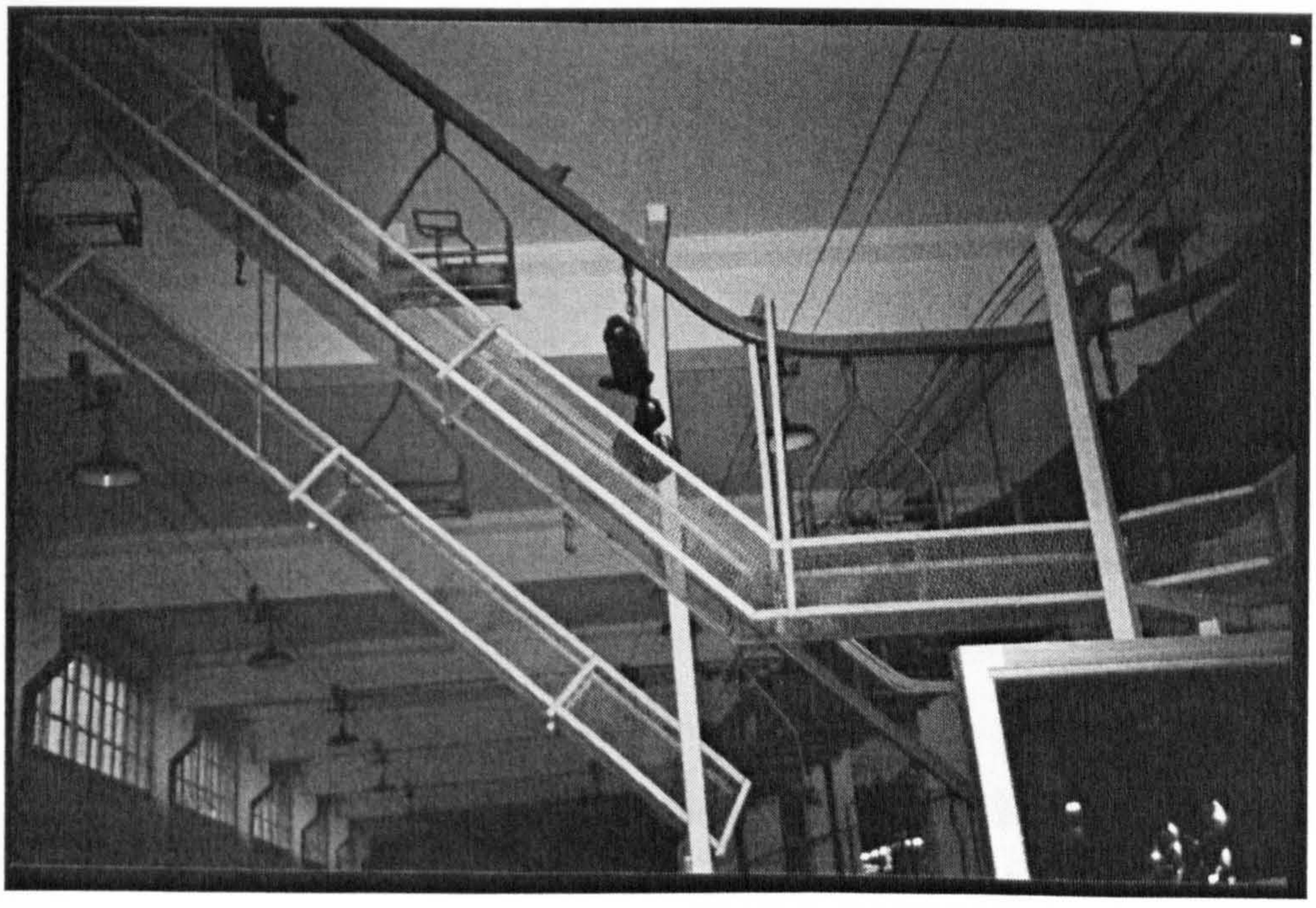
Picture 4. Workers in Auto-7 Are Operating Machines.

Picture 5. Subassembly Workshop in Auto-6.
Source: Booklet in Auto-6.

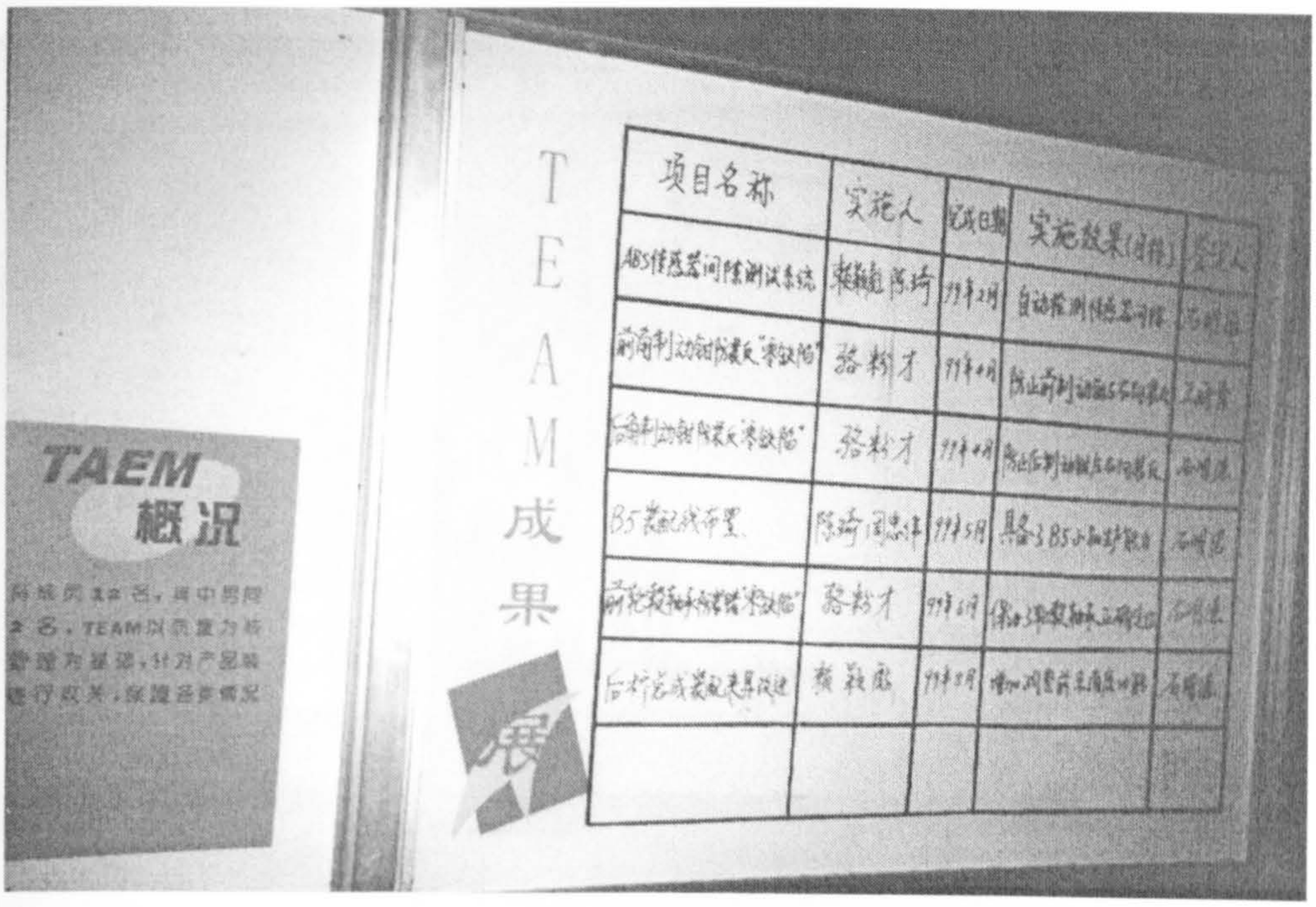
Picture 6. One Kind of Kanban Used in Auto-3.



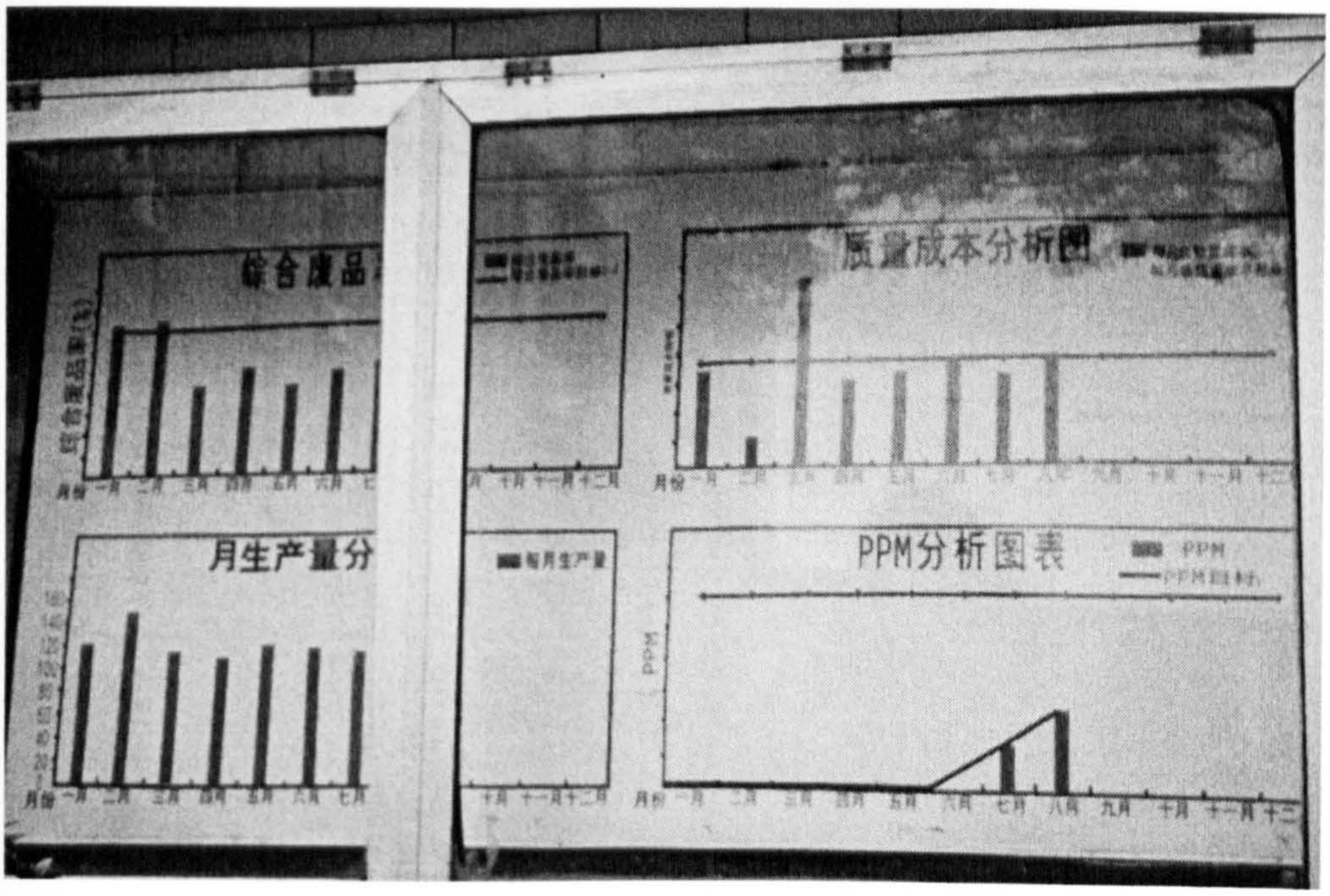
Picture 7. Cellular manufacturing in Auto-2.
Source: Booklet in Auto-2.



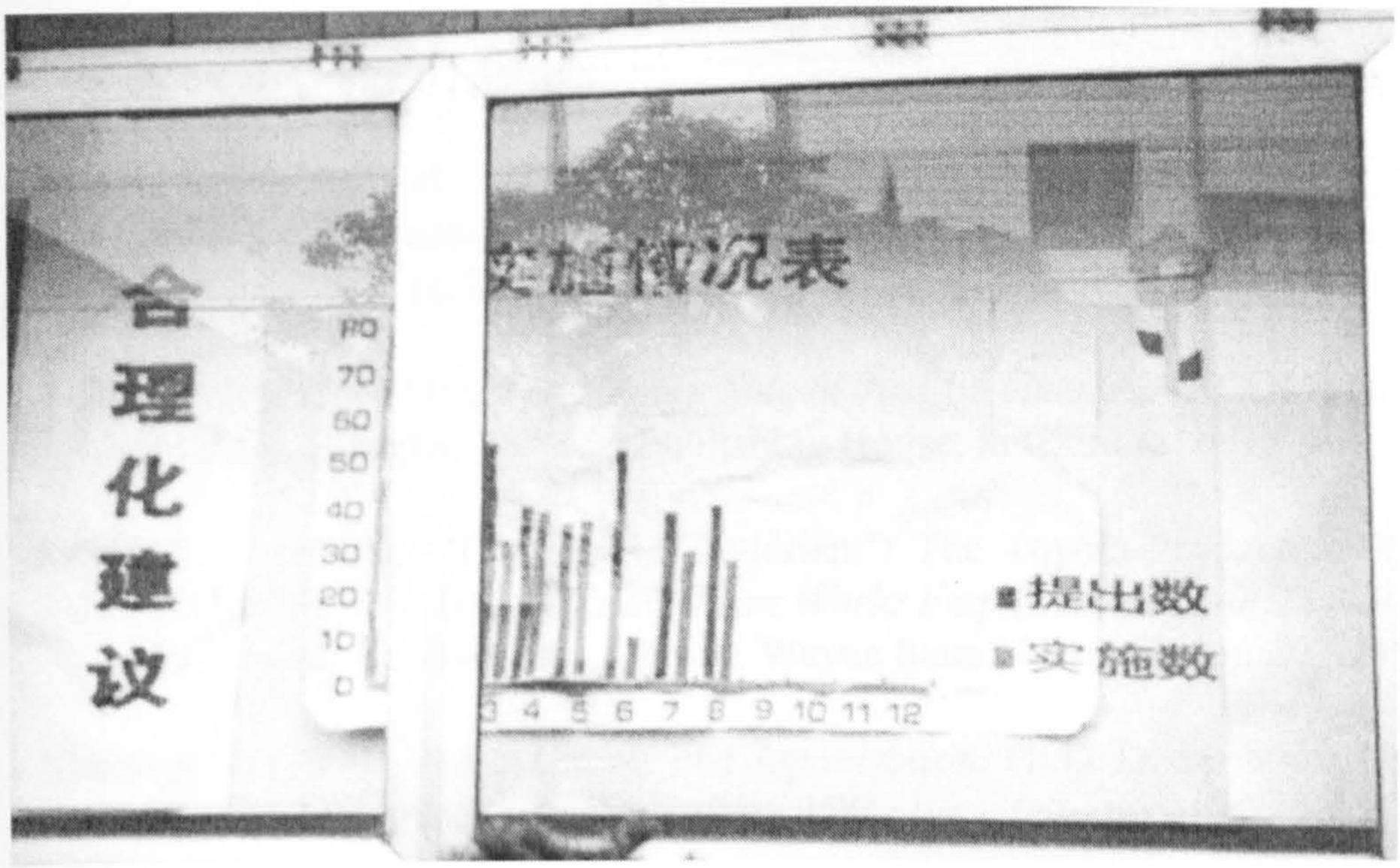
Picture 8. One-Piece Flow in Auto-3.



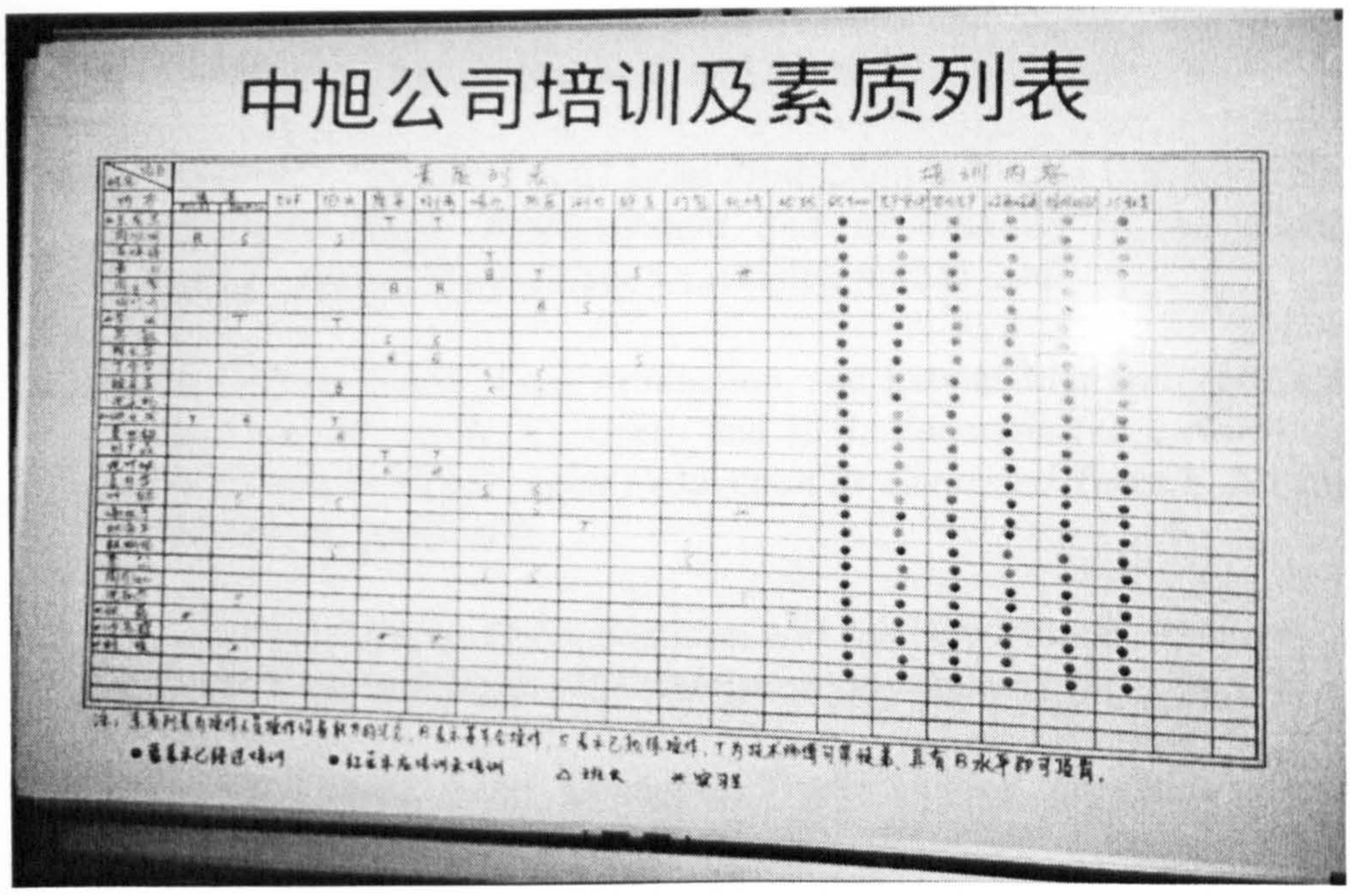
Picture 9. Display of Team Working Projects in Auto-3.



Picture 10. Display of Quality Chart in Auto-4.



Picture 11. The Number of Implemented Suggestion, as Displayed in Auto-4.



Picture 12. Training Programmes for Individual Workers, as Displayed in Auto-3.

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